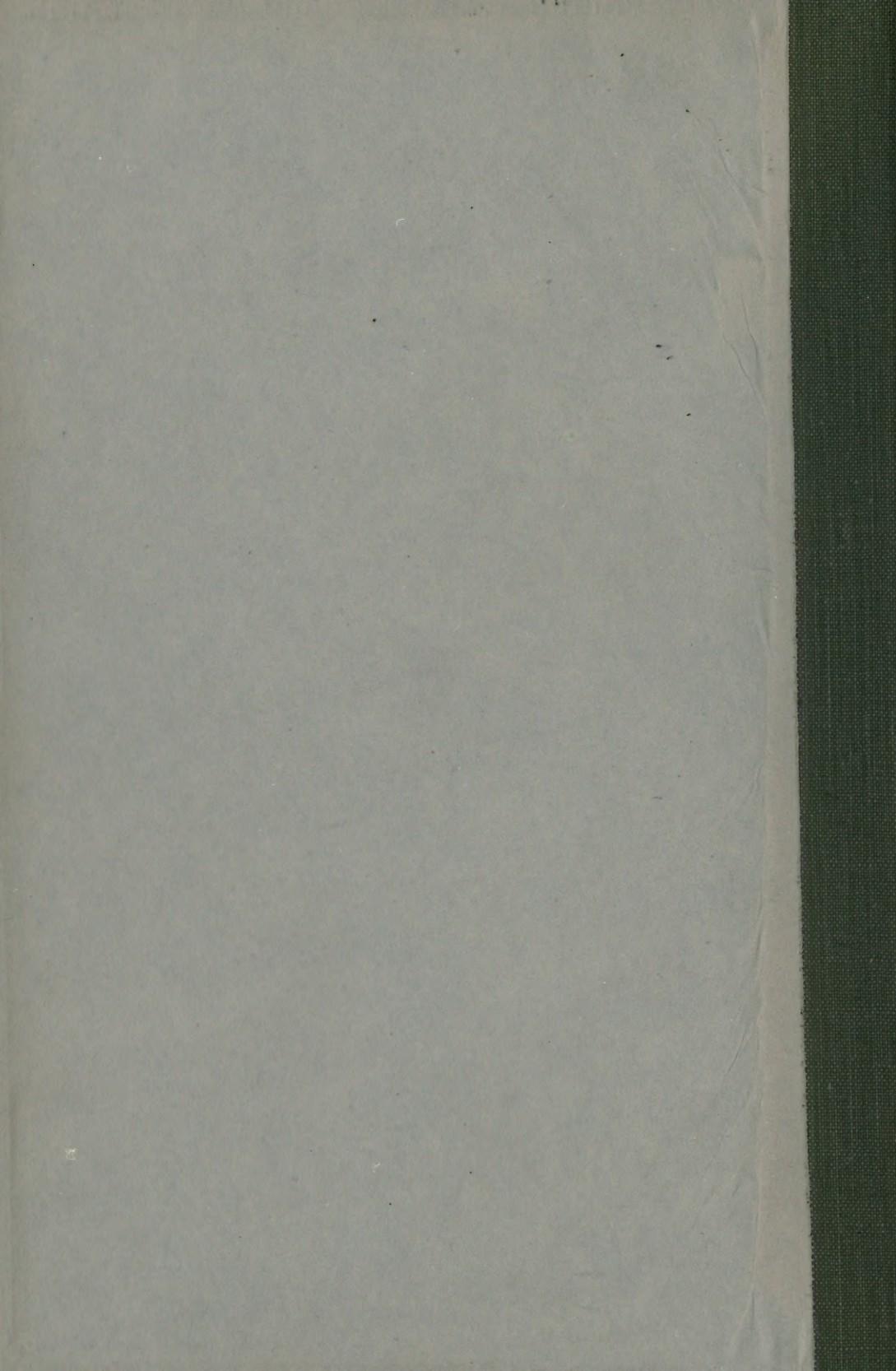


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 lids, 9, (250), (291), (309), (372), (616), orbit, (44), (127), (250), (681).
 optic nerve, (260).
 pituitary, 853.
 pseudo, (308), (713).
 retinal, (459).
 treatment of, 9, 91, (127), 427, 641, (710).
 Ulcer, corneal, (46), (47), (460), 604, (688), (708), 917.
 Ultraviolet light, (309).
 Urotropin, (311), (696).
 Uveitis, (48), (213), (290), (379), (619), (688), (689), (690), 906, (926).
 Vaccines, (477).
 Variola, 854.
 Vision, acuteness of, (678), (862).
 changes in with posture, (679).
 in epilepsy, (678).
 psychology of, (678).
 rainbow in glaucoma, (712).
 Visual fatigue, 199, (133).
 fields, (28), (31), (73), (78), (209), (611), 884, (925), (926).
 perception, (678).
 Vitreous opacity, (624), (868), 906.
 prevention of loss, (610).
 War injury, 91, (315), (536).
 Wassermann reaction, (280).
 Water glass injury, (215).
 Wharton-Jones operation, (841).
 Whooping cough, 915.
 Xeroderma pigmentosa, (317).
 Yellow spot, (558).
 Zinc ion, (477).
 Zoster herpes, 853, (860).

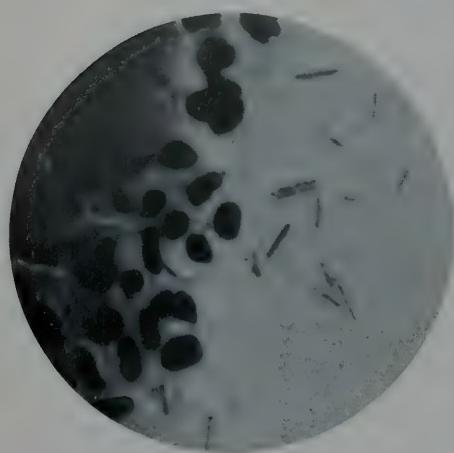


FIG. 1.—SMEAR OF CONJUNCTIVAL
SAC. X 1200 (CASE 1)



FIG. 2.—SMEAR OF AGAR CULTURE.
X 1200 (CASE 1)



FIG. 3.—SMEAR OF AGAR CULTURE SHOWING
SPORES IN THREADS. X 1200 (CASE 1)



FIG. 4.—FOUR-DAY AGAR CULTURE.
(CASE 1)

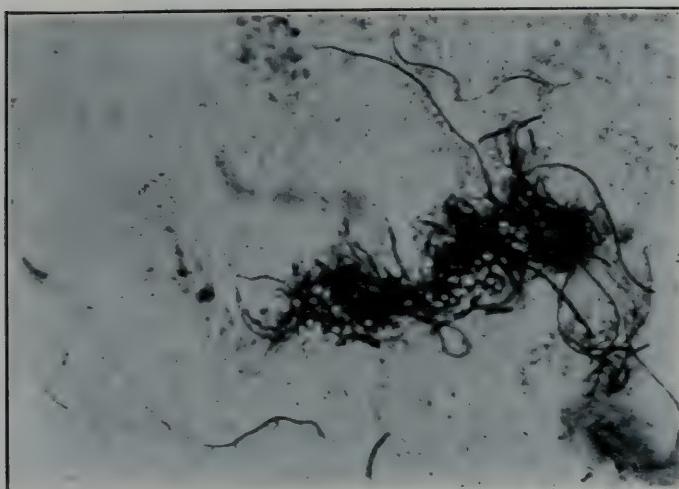


FIG. 5.—SMEAR OF 48-HOUR CULTURE. (CASE 2)



FIG. 6.—SMEAR OF MEIBOMIAN SECRETION
X 1200. (CASE 3)



FIG. 7.—SMEAR OF MEIBOMIAN SECRETION
SHOWING SPORES. X 1200 (CASE 3)

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TRICHOMYCETES IN OPHTHALMOLOGY. I. LEPTOTHRIX.

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This paper reports work done in the Department of Bacteriology and Pathology in the University of Nebraska. It deals with the findings in three cases of conjunctivitis and involvement of the Meibomian glands. It also reviews the literature referring to this subject; and tabulates the characteristics of the organisms found by different authors. A detailed bacteriologic report with more complete discussion of the literature and bibliography has been published in the Journal of Infectious Diseases, October, 1920.

To most ophthalmologists, the name Leptothrix suggests the question, once a good deal argued, of the cause of lacrimal concretions. It is not with this question, however, that the present author is mainly concerned. He wishes to record his observations during the past year, of Leptothrix in two, and probably three, cases of other ocular conditions.

CASE 1. Helen N., aged 22, had been suffering with recurrent attacks of conjunctivitis in both eyes for over a year, becoming more frequent till she came in for treatment. Her present acute attack started a week ago, with pain, redness and slight discharge from the right eye.

When first seen, vision was 20/15 in each eye. Right eye presented a fairly severe conjunctivitis, with marked periorbital congestion, and marked congestion of the bulbar conjunctiva and of the lid borders, extending back along the Meibomian glands. There was some sticky secretion in the lower fold, which was thickened and hyperemic, but with no distinct nodules. The upper tarsus and fold were smooth and only slightly congested. The preauricular glands were not palpably enlarged. Left eye showed blepharitis, less marked than in right eye, and slight hyperemia of the lower fold.

What made this appear somewhat different from the usual case of conjunctivitis was the marked involvement of the bulbar conjunctiva and the inflammation along the Meibomian glands. A small amount of secretion was squeezed

out of these glands in both eyes. Smears and cultures of this were made, and of the secretion in the lower fold.

A zinc collyrium and yellow oxid of mercury ointment were prescribed, and the patient allowed to return to her home in the country. After five weeks she writes that both eyes are quiet, with no more discharge.

Smears of the secretion in the lower right fold showed numerous Gram-positive thread-like organisms, many 10-15 μ long, by 1-1 $\frac{1}{4}$ μ thick. Some were curved, and many presented clear, refractile, subterminal bodies which appeared to be spores. (See Fig. 1, Plate I). The organisms were all extracellular. Smears from the Meibomian glands showed no organisms.

Cultures on blood serum from the right lower fold showed in 24 hours a pure culture of a Gram-positive organism appearing as long, unbranched, curved threads, with some shorter rods. All forms were nonmotile. In cultures a few days old, coils of the thread-like organisms were found 50-100 μ long. Spores were formed after 48 hours, seen subterminally on the rods and all along the threads, and taking Moeller's spore stain. Free spores were numerous in older cultures. Nothing resembling branching was ever observed. The serum was liquefied after 7-10 days. (See Figs. 2, 3, 4, Plate I.)

Subcultures grew aerobically on all the ordinary media, freely at 37 C., slightly at room temperature. Anaero-

bically, it grew slightly or not at all. Subcultures from single colonies on a plate showed rods, long threads and spores. The most characteristic growth was in broth. The broth remained clear, with no pellicle, while a feathery clump of growth collected slowly at the bottom, sending upwards long threads which almost reached the surface after ten days or more. Gelatin was liquefied slowly at room temperature. No odor ever developed. The iodin reaction was negative in all media.

Resistance to heat: Cultures left in the boiling water bath for one hour were still viable.

Pathogenicity: The organism proved markedly pathogenic for guinea-pigs, not at all for rabbits or white mice. Guinea-pigs injected intraperitoneally and subconjunctivally with 5 and 2 m. of suspended organisms died within 24 hours. A guinea-pig received 2 drops of peritoneal fluid from the first guinea-pig in his conjunctival sac, and the conjunctiva was deeply scarified, death following in about 12 hours, with little local reaction, but signs of general infection. Smears and cultures at autopsy revealed pure cultures of the thread-like organism, except in G. P. III, where staphylococci were also obtained. In G. P. II, a pure culture was obtained from the heart's blood.

Attempts to produce conjunctivitis in animals were unsuccessful. Of two inoculations with loopfuls of growth in my own conjunctival sac, the first produced lacrimation and irritation lasting 24 hours, perhaps from the foreign material. The second was without effect.

Serology: Attempts to demonstrate toxin formation by injecting in a guinea-pig the clear fluid from a 10-day broth culture passed thru a Chamberlain filter were unsuccessful.

Two rabbits were successfully immunized by increasing intravenous doses, their sera agglutinating the organism strongly in dilutions of 1:160 and 1:320 respectively, controls being negative in normal salt, normal rabbit and normal human serum. Neither serum agglutinated the Leptothrix isolated from Case II in any dilution.

In this case, tho no organisms were found in the Meibomian glands, their state of inflammation, with the history of recurring attacks, suggested that the organisms might have harbored in these glands, enough of them escaping from time to time to cause conjunctivitis. It seems probable that a more careful search would have revealed them in the glands.

CASE 2. Mr. H., a man of 27, complained of symptoms suggesting eye-strain for the past year. He was found to have a slight refractive error, but the congestion of his conjunctiva, especially on the tarsi along the Meibomian glands, combined with a small amount of sticky secretion in the sac, seemed to indicate another factor to account for his symptoms. No organisms were found in the smears of the conjunctival secretion. Pressure on the Meibomian glands expressed an excess of whitish, waxy, semi-fluid material from all their orifices. A zinc collyrium was prescribed, and the symptoms were relieved for a time, but in two weeks he returned with the same trouble. A correction for reading was given, and his glands were thoroly squeezed out. This was repeated in six weeks, when there was still an excess of fluid, tho symptoms were slight, and the congestion much less. The patient was told to return for squeezing out whenever symptoms returned, but has not been heard from.¹

BACTERIOLOGIC FINDINGS: Smears of the Meibomian secretion showed a fair number of large rods with rounded ends. There were no true threads, but some of the bacilli were as long as a haybacillus, and all seemed too thick for *B. Xerosis*. Both Gram-negative and Gram-positive forms were seen.

Cultures: Broth culture showed, besides staphylococci and Xerosis bacilli, a predominance of long organisms, some 10-12 μ long and often curved. A pure culture of this was obtained from a single colony on a plate and proved to be somewhat similar to the organism of Case 1. It formed threads 20-50 μ long, never branching, and formed true spores. It grew much more delicately, however, at 37° C., and not at all at room temperature, formed fewer spores,

and the threads never grew as long as those of the first organism. It proved nonpathogenic for animals, and, as mentioned above, showed no relation serologically with that organism. (See Fig. 5, Plate II.)

Whether the large bacilli in the smears were the same organism isolated in culture is questionable. The thread-formation in culture, however, was not marked till after 2-4 days, so it is quite possible that the organism might form few or no threads on its human host, and still form them in media which favored complete development. The organism in cultures, at any rate, is seen by its unbranched thread-formation to be a Leptothrix, and whether a pathogenic agent or not in this case, at least an inhabitant of the Meibomian glands.

CASE 3. Mr. F., aged 60, complained of a burning sensation and tired feeling in his eyes for over a year. Vision was brought up to 20/20 with suitable correction. Both eyes were inflamed, with lids thickened and reddened at the ciliary margin. On squeezing the lids, a large amount of semitransparent, honey-like fluid was expressed from most of the Meibomian glands. As the patient was obliged to return home at once, the expression was made as complete as possible, zinc chlorid one grain to the ounce was prescribed, with zinc cerat ointment for the lids; and the family doctor was instructed by letter how to express the lids twice a week. A letter two months later reports no further symptoms while the treatment is continued.

Smears: One smear of the material from the glands showed a large clump consisting of curved, Gram-positive threads, with shorter Gram-positive rods, some of which were curved. (See Figs. 6 and 7, Plate II.) No branching was seen. A few Gram-positive threads were seen in other smears, with a few Gram-positive diplococci. It seemed as if a small lump or concretion of the thread-like organisms had been broken up on the first smear, while no other such concretions had been obtained on the others. An aerobic culture on blood-serum was the only one taken, and this showed only staphylococci and Xerosis bacilli.

From smears alone, a positive diagno-

sis between Leptothrix and Streptothrix can hardly be made, since it is known that Streptothrix may show notable branching only in culture. The threads were $1-1\frac{1}{4}\mu$ wide, however, about twice as wide as the threads of most Streptothrixes, and showed refractile, spore-like bodies, similar to those seen in the smears of Case 1 (See Figs. 1, 2 and 3), so that the diagnosis of Leptothrix may be considered the most probable.

LITERATURE.

Probably the most satisfactory classification of the higher fungi is that of Petruschky (1), who divides them into true molds and Trichomycetes, including in the latter as four distinct groups Leptothrix, Cladotrichia, Streptothrix, and Actinomyces. The Leptothrix group is characterized by the formation of threads with neither true nor false branching. The iodin reaction may be considered of no value, as Fricker (2) and others have shown that it is due to the presence of starch granules, which depends on the previous nutriment of the organism.

The occurrence of Leptothrix in the body as a saprophyte has been well-known since Bizzozero (3) in 1884 described Leptothrix Epidermidis as a constant finding on the normal skin; and Miller (4) distinguished four types of Leptothrix (Buccalis) in the normal mouth.

It has been described as a pathogenic organism in lesions of various regions. In mycoses of the mouth, especially of the tonsils, Michelson, Fraenkel, Chiari, Stoos, Dubler, Hering, Epstein, Wright, Newcomb and others have found Leptothrix in smears or sections.

Leyden and Jaffé found it in putrid bronchitis and Pearce found it in necrosis of the larynx and esophagus. v. Arx found it in two cases of phlegmon of the neck; v. Herff describes vaginitis which he attributed to Leptothrix. Leber (5) repeatedly inoculated rabbits' corneas with fresh material from the tonsils containing Leptothrix, and produced progressive lesions of the cornea, sections of which showed Leptothrix elements. He appears never to have been working with pure cultures. Bjelzoff,

(quoted by Jacobsen) in a case of pyemia, found masses of threads resembling Leptothrix in the vessels of the liver at postmortem. If this organism were really Leptothrix, its occurrence is interesting, as indicating that the organism may rarely assume extremely pathogenic properties.

The large number of concretions of the canaliculi purporting to be caused by Leptothrix are of especial interest to ophthalmologists. Fifteen observers of such concretions have reported Leptothrix as the causative organism. They are: v. Graefe (10 cases), Narkiewicz-Jodko (2 cases), Haase, Bajardi, Hirschberg, Segelken, Cannas, Schirmer, Foerster, del Monte, Cappellini, Higgins, Bugier, Casumet and Hirschler. The same objection applies to nearly all of these reports, that no cultures were obtained. Many of the observations were made, in fact, at a time when there was no question of distinction between branched and unbranched forms, any thread-like organism being called Leptothrix, after von Graefe. Segelken, Hirschberg, and others, however, noted complete absence of branching in their smears, and thought this, with their failure to grow in culture, argued for Leptothrix. Cannas' case (6) was the only one in which culture was successful, and this, under somewhat doubtful conditions. In a mixed culture one colony was found which, on being transferred, gave a pure growth of branched threads. This was evidently Leptothrix, but Axenfeld (7) considers it doubtful if it was the responsible organism.

Cannas and Bajardi believe that Leptothrix, Streptothrix Foersteri, and Actinomyces may each cause lacrimal concretions. Majocchi, studying a series of concretions of the salivary ducts, came to the same conclusion for these concretions. As Axenfeld has pointed out, however, some of the concretions which gave a Streptothrix on culture showed very slight branching in the smears, and since only the one somewhat doubtful culture of Leptothrix was obtained from a concretion, he is probably justified in concluding that Leptothrix as a cause of lacrimal concretions occurs but rarely. Harman (16) in cultures of

one hundred conjunctivae of healthy school children reports in his table Leptothrix Buccalis as having been found twice, but gives no further details. It was evidently in mixed culture.

In recent years Verhoeff and Derby (8) have found a peculiar thread-like organism in sections of excised conjunctiva and lymph nodes from cases of Parinaud's conjunctivitis. By a special staining method, they have shown in eleven out of twelve cases masses of threads and granules in necrotic areas in the tissues. The threads were 3-10 μ long in sections, but in teased preparations could be found as 30 μ . They were unbranched and called by the authors Leptothrix. Keiper (9) since their report, obtained sections in which one pathologist claimed to have found such threads, but neither Verhoeff nor Warthin and Novy, to whom the material was submitted, could concur in this finding. Since, so far as I am aware, no culture has been obtained, it seems that the diagnosis of Leptothrix, as in the case of concretions, must remain somewhat questionable.

The only description of Leptothrix infection of the globe which I have found is that of Sorokin (17). This author, in a case of panophthalmitis developing after extraction, found the affected parts of the cornea covered with small white masses which proved to be clumps of unbranched threads. No other organisms were found. While no pure cultures were obtained, pieces of cornea in various media were studied at frequent intervals, for four days, so that a fairly reliable idea of its growth and morphology was obtained. In drops of human blood on potato especially, growth could be followed for four days, when it died out or was overgrown with contaminants. The threads increased in length, developed septa which marked the site of the division into smaller threads. These remained always unbranched. No spores were observed. The author thinks his organism a form distinct from Leptothrix buccalis and suggests the name Leptothrix oculorum mihi.

From a bacteriologic point of view, the few cases where pure cultures of Leptothrix have been obtained are of

more interest. Besides the case of Cannas, I have found but two, possibly three, observers who have definitely isolated Leptothrix from lesions, and three from normal tissues, with some more doubtful cases. Arustamow (10) isolated two types, an anaerobic strain from the urine of a tabetic, and two aerobic strains from the tonsillar crypts in cases of tonsillitis. Cozzolino (11) obtained thirty pure cultures from the different organs at autopsy from a young girl who died with retropharyngeal abscess and symptoms of basilar meningitis following a periauricular swelling from which the same organisms were recovered. Pathogenicity was marked for guinea-pigs and house mice.

Vignal (12) in a series of plate cultures from the tartar of normal teeth isolated a slow-growing aerobic form of Leptothrix. Bordoni-Uffreduzzi (13), from the skin between the toes and in the groin of normal persons with intertrigo, isolated a *Bacillus Epidermidis* which they say is identical with the Leptothrix Epidermidis described in smears by Bizzozero. Lehmann and Neumann (14) evidently grew a similar organism from the normal skin. The *Bacillus* (Leptothrix?) *Pyogenes Filiformis* isolated by Flexner (15) from the viscera of a rabbit dying from infectious abortion, which grew only on tissue media, is probably a Leptothrix, tho it showed a formation of sheafs and rosettes which somewhat suggests Cladotrich. All these organisms showed the unbranched thread-formation of Leptothrix.

Table I sums up their more important properties. Other organisms said to have been Leptothrix have shown some form of branching, or the data was too meagre to make a diagnosis at all certain. Jacobsen (18), from the tonsillar crypts of three cases, apparently obtained cultures of Leptothrix. Grown on potato at room temperature, it appeared as small colonies after three days, forming small depressions in the media, and later fusing to form a finely granular surface. No spores are described. He never worked with single colonies on plates, and Arustamow and others have questioned whether a pure culture was obtained. Since similar unbranched threads were

obtained in smears and cultures repeated in two of the cases, it seems to the author likely that a pure culture of Leptothrix was obtained.

SUMMARY: Table I shows more or less important cultural and morphologic differences between nearly all the strains isolated. It seems certain that the name Leptothrix concerns a complex group of organisms containing, as has been shown for the Streptothrices, several distinct species. The author's two strains showed many points of difference. There seems to be no definite biologic distinction between Leptothrix Epidermidis and Leptothrix Buccalis; and Miller's four groups of Leptothrix Buccalis are based on the unsatisfactory grounds of morphology and the iodin reaction.

In such a confusion of small differences, the property of spore-bearing seems to the author more definite than the others. His two strains, with those of Cozzolino and Bordoni-Uffreduzzi, showed definite spore-formation; while those of Flexner, Lehmann and Neumann, Vignal and Cannas formed no spores. In his previous article the author has suggested the possibility of placing the first mentioned organisms in a tentative group of Leptothrix Sporogenes, calling the others Leptothrix Simplex. As more pure cultures are reported, these groups will probably be found to contain several distinct species. It may be found, however, that all forms may produce spores under certain conditions.

There can be no doubt, in view of Cozzolino's findings, which are borne out by the author's and probably also by those of Flexner, that true Streptothrices can be distinctly pathogenic for man and animals. The author's finding Leptothrix in the ocular apparatus makes it more probable that some few cases of lacrimal concretions said to have been caused by Leptothrix were really caused by that organism, tho Streptothrix is undoubtedly much the more common agent. The source of Leptothrix in the conjunctival sac may be the mouth by means of a finger, or it may migrate occasionally from the skin of the lids to the Meibomian or other glands, and thence to the sac.

TABLE I

Author	Source	Gram-stain	Spore-formation	Tetin Reaction	Motility	Oxygen Requirements	Pigment-formation	Pathogenicity
Arustamoff I	Urine of a tabetic	*N.M.	Prob. +	N.M.	-	Anaerobe	-	Not tested
Arustamoff II (2 strains)	Tonsillar crypts in tonsillitis.	N.M.	Prob. +	N.M.	-	Aerobe	+	Not tested
Cozzolino	Perianuricular abscess and viscera at post-mortem	+	N.M.	+		Aerobe	+	Positive for guinea-pigs, and house mice. Negative for rabbits and white mice
Vignal	Tartar of normal teeth	N.M.	-	N.M.	N.M.	Aerobe	+	Red on serum and egg white
Bordoni-Uffreduzzi	Normal skin and skin in intertrigo	+	N.M.	N.M.	N.M.	Aerobe	-	N.M.
Lehmann and Neumann	Normal skin	+	-	-	+	Aerob.	+	Negative : Guinea-pigs and human skin
Flexner	Uterus and viscera of rabbit at postmortem	-	-	-	-	Aerob. (only on tissues)	-	Agar: Brownish-Yellow Potato: Reddish-Brown Not tested
Camass	Concretion of canaliculi	+	-	+	N.M.	Aerobe	+	Positive for rabbits and guinea-pigs. Negative for mice, pigeons and dogs
Author I	Conjunctiva in recurring conjunctivitis	+	+	-	N.M.	Aerobe	-	Negative
Author II	Melbomian glands in chronic melboatitis	+	+	-	-	Aerobe	-	Positive : Guinea-pigs. Negative : Rabbits, white mice, author's conjunctiva
								Negative: Guinea-pigs and author's conjunctiva

*N.M.—Not Mentioned.

CONCLUSIONS.

1. A strain of Leptothrix was found as the only organism in smears and cultures from the conjunctival sac in a case of recurrent conjunctivitis. It was pathogenic for guinea-pigs and showed definite spore-formation.

2. A Leptothrix was isolated from a case of chronic meibomitis. It showed definite spore-formation, but was non-pathogenic for guinea-pigs, serologically distinct from the first strain, and presented cultural differences from it.

3. What is probably a Leptothrix was

found in smears from a second case of chronic meibomitis. It apparently showed true spores.

4. The group of Leptothrices includes at least two, and probably more, distinct species.

The writer wishes to express his appreciation to Dr. J. T. Myers of the University of Nebraska, and to Dr. Ludwig Hektoen of the John McCormick Memorial Institute, for their kindness in going over his material with him, and to Dr. A. S. Rubnitz for translating the articles of Arustamow and Sorokin.

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CARCINOMA OF THE EYELIDS TREATED WITH RADIUM.

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Recently, there has been a great outpouring of reports on the treatment of skin carcinoma with radium. With few exceptions, these articles have omitted some important detail in the description of the lesion, or the technic of the radium application, which would

history) were made with silver tubes (0.2 to 0.3 mm. thick) enclosing glass capsules, containing approximately 25 or 50 mgm. of radium element as the radium barium sulphate. Also, unless otherwise specified, the surrounding tissue was protected with lead from



Fig. 1.—Case I before treatment, March, 1918.

seem to be essential, if they be published with the desire to be helpful.

At the risk of being somewhat tedious, we shall make this report cover eight cases of carcinomas about the eyelids, with clinical findings and complete details of the application of radi-

0.5 to 2. mm. thick and 0.5 to 1. mm. of gum rubber was interposed between the surface of the lesion and the radium applicators. In those cases where it was imperative to protect the globe and ocular conjunctiva from prolonged cautery radiation, we have made use



Fig. 2.—Case I July, 1920, more than two years after the last application of radium.

um. These eight cases will illustrate some of the usual and unusual features that we have met in a series numbering over 100 cases occurring about the eyes.

The clinical diagnosis of carcinoma was made, in all cases treated with radium, by the consultant staff of the Barnard Free Skin and Cancer Hospital.

In general, all applications of radium (unless otherwise stated in the case

of oval lead screens from 0.5 to 1 mm. thick which were fastened to fit the contour of the globe and to project downward and upward into the conjunctival fornices after the form of an artificial eye. These screens were dipped in melted paraffin to give them a smooth coat of nonconductive material. After instilling a few drops of liquid vaseline under the lids, they were inserted with only slight discomfort to the patient. In no case was it

necessary to use a local anesthetic for the introduction of these screens, and it was found that they were self retaining, if made properly. In one instance such an appliance, with radium fastened to it, was borne comfortably for 24 hours. (See Case No. VII.)

CASE I. W. H. Figure 1 shows the condition at the time of admission,

per square cm. of the surface area of the tumor.

CASE II. J. H. Figure 3 shows the condition on admission. The carcinoma involved the inner canthus of the left eye and the medial three-fourths of the ciliary margin of the upper lid. It was first noticed four years previously. There had been no treatment. The



Fig. 3.—Case II before treatment, November, 1918.

March, 1918. The carcinoma involved the inner two-thirds of the lower left eyelid. Duration 11 years. The only treatment had been given by the family physician who made applications with some caustic solution.

Radium 75 mgm. in silver tube appli-

growth was approximately $3\frac{1}{2}$ by $2\frac{1}{2}$ cm. and produced a thickening of the upper lid to 1 cm. There was a chronic purulent conjunctivitis.

Radium applications as follows: Nov. 27, 1918, 100 mgm. for 4 hours in silver tube applicators covered with .5 mm.



Fig. 4.—Result of treatment, remaining clinically cured after two years.

cators covered with 0.5 mm. of rubber was applied for four hours on March 11th, 1918. Again on April 7th, 1918, 50 mgm. was similarly applied. There was a complete retrogression of the tumor noted on June 13th, 1918. The scar was soft and pliable; the vision showed a slight improvement; there was no ectropion and aside from the loss of lashes, there was 100% efficiency of the eye. There has been no recurrence to date. Figure 2 taken July, 1920.

The total radium given was 500 milligram hours, averaging about 100 mg.h.

rubber. Jan. 6, 1919, 100 mgm. for 4 hours with same filter. Feb. 21, 1919, 25 mgm. for 4 hours similarly applied to persistent nodule at inner canthus.

Complete retrogression of the carcinoma and healing of the burn was noted on March 27th, 1919. The vision was not impaired. The patient has remained clinically cured to date. Aside from the loss of lashes of upper and lower lids, this case was a 100% efficient eye.

Total radium dosage 900 mg.h. or about 150 mg. h. per square cm. of tumor surface.

CASE III. C. H. Both photos are indistinct but one can see from figure 5 that the ulcerating carcinoma involved the outer angle of the left eye and the upper lid. The growth was roughly triangular, about 3 cm. on each side, and was firmly anchored to the superciliary ridge and the external angular process. There were early cataracts of both eyes.



Fig. 5.—Case III before applications of radium, December, 1919.

Surgically the growth could not have been removed properly without an enucleation.

Radium treatment was given Dec. 19, 1919, as follows: 100 mgm. for 6 hours with the silver tube applicators placed

tected in the vision or status of the cataract of the right eye.

The total radium dosage was 600 mg. h. or from 60 to 100 mg.h. per square cm. involved.

CASE IV. L. T. Figure 7 taken at the time of the radium treatment shows a carcinoma involving the outer one-half of left lower eyelid, and extending 2 cm.



Fig. 6.—Case III March, 1920, three months after one application.

on to the neighboring cheek. The mass was adherent to the infraorbital ridge in the scarring produced by two previous caustic treatments. The neighboring skin showed senile changes with a definite keratosis projecting from the lower



Fig. 7.—Case IV before radium treatment, March, 1918.

radially about the margin. The globe and surrounding tissue was protected with 1 mm. of lead.

This patient was not seen again until March 19th, 1920, at which time there was no evidence of the growth, aside from a soft pliable scar. There was no scar contracture. The vision was improved, and there was no evidence of the cataract of the left lens, which had been present at the time of the radium application, altho no change could be de-

scribed in the vision or status of the cataract of the right eye. Two silver tube applicators, each containing 25 mgm. of radium were applied for 6 hours on March 4th, 1918. No protection was used for the globe in this case, and there resulted a very marked conjunctivitis with considerable edema of lower lid.

By April 9th, 1918, the lesion showed complete retrogression, but there was some ectropion of the lower lid. She was last seen April 1st, 1919. See Figure 8.

The total radium dosage was 300 mg. h. averaging 60—75 mg.h. per square cm. of surface involved. This is a low dosage, given on account of the scar.

CASE V. S. B. This carcinoma had been present for five years before entering our clinic. Four years ago, the growth was curetted and the base cau-

The nodule on the left side of the nose was given 25 mgm. for four hours thru a 6 mm. fenestrum in $\frac{1}{2}$ mm. lead.

This patient was next seen on December 4th, 1919. It was noted that there was no clinical evidence of the carcinoma or the pterygium, and he has re-



Fig. 8.—Case IV, one year after treatment.

terized. This treatment was repeated three months ago, since which time the carcinoma developed rapidly. Figure 9 shows the condition on admission. The bulk of the tumor was at the inner canthus with the ulceration extending 6 mm. along the conjunctival surface of the

mained well to date. Figure 10 was taken in July, 1920.

Radium dosage to canthus was 100 mg.h.

CASE VI. E. W. Figure 11 shows this "recurrent" carcinoma involving the entire right upper lid. Six months before

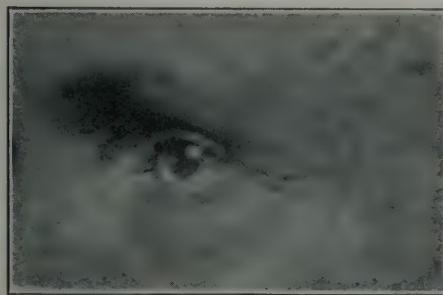


Fig. 9.—Case V, after repeated curetting before use of radium, October, 1919.

upper lid and 2 mm. along the lower lid margin. There was also a persistent nodule 4 mm. in diameter on the left side of the nose, a pterygium covered the medial quarter of the globe to the margin of the pupil. On October 17th, 1919, a 25 mgm. silver tube covered with 0.5 mm. paraffin was applied for four hours. The active end of the tube was in contact with the pterygium covering this portion of the globe. The scar tissue was protected with lead.



Fig. 10.—Case V, July, 1920, nine months after radium application.

admission the growth had been cauterized (actual cautery) with the apparent loss of substance from the ciliary margin thru the tarsal cartilage. This defect was partly filled with a projecting carcinomatous mass, which extended to both angles of the eye and upward for a distance of 6-7 mm.

He had five applications of radium as follows:

April 7, 1918, 25 mgm. for 4 hours equals 100 mg.h.

June 7, 1918, 25 mgm. for 2 hours equals 50 mg.h.

October 10, 1918, 25 mgm. for 3 hours equals 75 mg.h.

Dec. 9, 1918, 50 mgm. for 3 hours, silver brass 1 mm. Distance 5 mm.

Feb. 8, 1919, 50 mgm. for 18 hours, silver brass 1 mm. Distance 10 mm.

All clinical evidence of carcinoma was

inferior conjunctival sac. This tumor, with the scarring of the previous treatment, caused an eversion of the lower lid with epiphora. The mass was firmly adherent to the floor of the orbit. Its posterior limits could not be palpated as the ledge of induration projected under the globe.

It was thought advisable to enucleate



Fig. 11.—Case VI, carcinoma recurred after cauterization. Before use of radium, April, 1918.

gone April 3rd, 1919. Since this time he has remained well. Save for the loss of substance of the upper lid in the region of the punctum, and the loss of lashes, this patient has an efficient eye. Function is estimated at 85%.

It will be noticed that the initial dose of radium was too small in this case.

and cauterize the floor of the orbit; but with the patient's permission, and with the recommendation of the consulting ophthalmologist (Dr. A. E. Ewing), we made the following radium application. October 9th, 1919, 50 mgm. in silver and rubber for six hours applied outside the everted lid. 25 mgm. in silver tube sur-



Fig. 12.—Case VI, after five applications of radium, April, 1919.

CASE VII. C. R. Figure 13 shows a persistent carcinoma of the lower lid following its "cure" by the application of "cancer paste" four years previous to admission. At the time the paste was applied the lesion was 3 years old and was described as about the size of half a pea. This patient has had bilateral pterygia covering the medial quarters of both globes since childhood.

On admission the carcinoma presented as an oval mass, 3 cm. long within the

rounded by 1 mm. brass and 1 mm. rubber for 24 hours, applied directly over the mass where it projected against the globe, in the lower conjunctival fornix. The only protection afforded the sclera was 1 mm. of lead formed to the contour of the globe covered with 0.5 mm. of paraffin. This application was borne without local anesthetic. There was an acute conjunctivitis with marked edema during the radium reaction.

This patient was next seen January,

1920, at which time, there was moderate ectropion (no epiphora) but no other evidence of the carcinoma. He was last seen Oct. 15th, 1920. The pterygium, which disappeared after the radium treatment, had recurred; but did not cover more than one-half its former area. See Fig. 14.

CASE VIII. W. H. This is one of

the margin of the large carcinoma of the right temple. Two 25 mgm. tubes were packed against the tumor of the inner canthus for 3 hours. These tubes were placed at right angles to each other, crossing the lid margins at right angles and in actual contact with the conjunctiva of the globe, which had become involved.



Fig. 13.—Case VII, four years after use of cancer paste and before use of radium, October, 1919.

our examples of multiple carcinoma. As will be seen in Figure 15 taken July 19th, there occur great numbers of senile keratoses about the face. Many of these showed pearly rolled borders. Beside the large one at the right temple, there is a carcinoma involving the entire inner

The small carcinoma seen in Figure 15 on the upper lid near the outer angle was treated with a 25 mgm. tube for four hours.

No clinical evidence of carcinoma was present when the patient was last seen July, 1920, Figure 17. The center of the



Fig. 14.—Case VII, one year after use of radium, October, 1920.

right canthus, and encroaching 2-3 mm. on to the conjunctiva of the globe, also extending on to the nose. This growth had been treated with cancer paste nine months before admission. This caustic treatment had opened the upper nares in this region. (See Figure 16, which was taken August, 1919, during the healing of the radium reaction).

He has had radium as follows: July 10th, 1919, 100 mgm. for 33 hours, applied in rubber covered silver tubes about

large scar on the right temple showed some roughening and pigmentation. It was noted that the keratoses in the immediate vicinity of the lesions had disappeared, due to the incidental irradiation.

The radium dosage for the large carcinoma was calculated so as to give approximately 100 mg. h. per square cm. of involved tissue.

DISCUSSION.

Clinically these tumors are well known to be slow growing, pearly, rose colored,

smooth nodules, with semi-translucent appearance, tending to occur, singly or in multiple, at the site of some slight traumatism or infection in individuals, having senile, hyperkeratotic areas in the region of the lids. The lesions tend to appear

in diameter with a central crater of ulceration, covered by a hemorrhagic crust.

Pathologically these carcinomas of the lids are made up of basal cells, closely packed together with very little stroma. They show little or no infiltration or

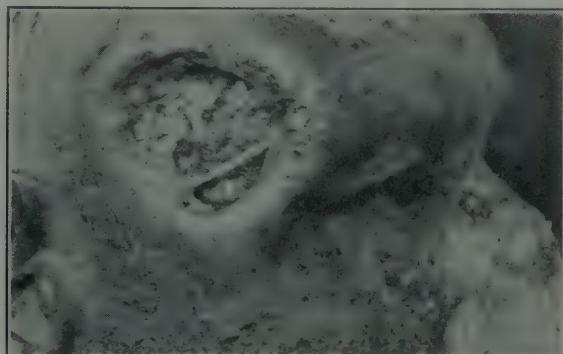


Fig. 15.—Case VIII, multiple carcinoma, treated nine months with cancer paste, July, 1919. Before use of radium.

about the outer or inner canthus, at a little distance from the ciliary margin; very few nodules begin at the center of the lids. In about 15% of the cases there occurs more than one nodule.

tendency to metastasize. In other words, they are benign.

Surgically, growths of the lids are most difficult to deal with satisfactorily, as the removal of even small nodules

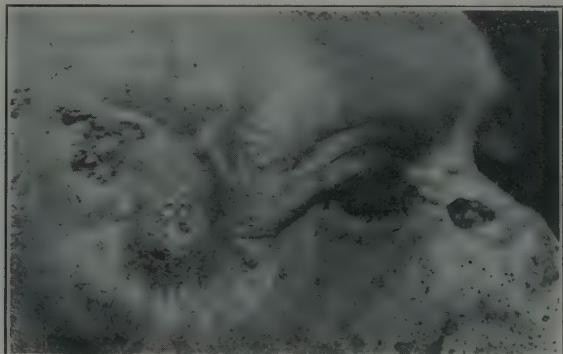


Fig. 16.—Case VIII, August, 1919. During healing of radium reaction.

Crater like ulceration is the rule by the time the lesion has attained a size of 5 to 6 mm., following which the growth becomes more rapid and the lesion increases markedly in thickness.

In many instances daughter nodules form about the margin so that the growth appears as a pink rosette of 2 to 3 cm.

often causes distortion of the marginal contour, and in those instances requiring the removal of over one-half the lid margin or either angle, there is little hope of restoring 100% function to that eye.

In speaking of inferior blepharoplasty, Major H. D. Gillies states in his work on "Plastic Surgery of the Face" that,

"where the loss of the lid edge is one-third or less, a very satisfactory repair can be made, but when the whole lid has been destroyed the operation results seen by the author are considerably wanting in finish." If this is true for the

first for radium rather than as a last resort. Much less favorable results were obtained in cases IV, V, VI, and VII on account of the presence of scar tissue, which is very easily broken down under irradiation leaving a tissue defect.



Fig. 17.—Case VIII, July, 1920.

repair of the lower lid in the hands of experts, then it must be almost impossible to supply a movable upper lid.

In general then, surgical procedures removing the greater portion of either lid sooner or later demand an enucleation to free the patient from the discomfort of infection and irritation of the exposed globe.

We have shown cases I, II, and III with markedly favorable results, cosmetically and physiologically, to illustrate what may be done if the growth comes

Attention is called to the fact that cataracts disappear with radium treatment; further, that cautery doses of radium are often of service in removing pterygia.

It has been observed that the sclera is particularly resistant to radium even in cautery doses, and that the conjunctiva reacts more quickly and is more rapid in its repair than the epithelium of the lids.

In general, then, with regard to the treatment of carcinomas about the eyelids, radium is the method of choice over any surgical procedure.

CAVERNOUS SINUS THROMBOSIS COMPLICATING MENINGITIS. MICROSCOPIC STUDIES.

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This is the report of a case which takes added significance from the careful autopsy and microscopic examination by which it is supplemented.

The patient was an Italian child, aged $3\frac{1}{2}$ years, who was brought into the New Haven Hospital on May 12, 1920.

The family and past histories were negative.

The present illness began on May 10th, when the left eye became red and slightly swollen. The child complained of pain in the eye but played as usual. The following day the eye was worse, and he appeared ill, refusing to eat; and remained quiet all day. On the 12th of May the child's condition became alarming and a physician was called, who sent the child into the hospital.

The physical examination showed an irritable child with the left eyelids edematous and injected, the globe proptosed. The edema and redness extended up over the forehead and back to the ear. The conjunctiva was injected and there was a slight purulent discharge. The right eye was normal. The lobes of the ears showed some excoriation but no discharge from the middle ears. There was no nasal discharge. The neck was stiff and Kernig's sign was strongly positive on both sides. Otoscopic examination showed no perforation of the membranae tympanorum. Ophthalmoscopic examination was unsatisfactory, but no gross changes were noted. Temperature was 101.5° .

A lumbar puncture was made, the pressure being much above normal. The fluid was cloudy, and smears showed many pus cells, but no organisms. Smears from the left eye showed many organisms, but no intracellular diplococci.

The day after admission to the hospital, the general condition was unchanged; but the right eyelids were red and edematous. Lumbar punctures were made at 9 a. m. and 9 p. m. and at each

operation, 40 cc. of antimeningococcus serum was injected.

Blood examination gave 4,200,000 reds, 72% hemoglobin, and 18,000 white blood cells.

On the 3rd day after admission to the hospital the general condition became worse, and the proptosis of the eyeballs and edema of lids increased. The patient died at 11 p. m. and a partial autopsy was secured.

AUTOPSY. The brain at autopsy showed the right cerebral cortex covered over with a large blood clot and the vessels intensely injected. A small amount of purulent exudate was present along the vessels of the base of the cerebral hemispheres, and a definite purulent exudate was found over the dura of the middle fossa. The left lateral sinus showed a small thrombus, which had extended back into the straight sinus and into the posterior part of the longitudinal sinus. Both cavernous sinuses were filled with a thrombus.

Bacteriologic specimens were obtained from the heart blood, right and left orbits and the brain. The heart blood was sterile. Both orbital cultures showed staphylococcus aureus; and the right, in addition, streptococcus hemolyticus. The brain culture gave staphylococcus aureus and streptococcus hemolyticus. The cultures showed grampositive diplococci in chains, and grampositive staphylococci in groups. The organisms in chains produced hemolysis on blood agar plates.

Section thru posterior part of left orbit showed a thrombus filling the ophthalmic vein. The center of the thrombus had disintegrated and showed large numbers of polymorphonuclear cells. At the periphery the thrombus was intact and the fibrin strands were seen forming a dense meshwork. There were large

numbers of mononuclear cells and a few polymorphonuclear cells surrounding the vessels and extending in all directions into the surrounding tissue. In some places there were areas of necrosis.

Section thru the posterior part of right orbit showed there were similar areas of cellular infiltration around the vessels, and extending into the surrounding tissue. There was marked disintegration of the nuclei and many places showed large numbers of nuclear fragments. The cells were largely mononuclear but polymorphonuclear cells were seen also. There were some blue staining masses suggesting clumps of bacteria.

Sections thru the clot in the left cavernous sinus showed an early thrombus. The typical structure with platelet columns, etc., was not seen. The thrombus was homogeneous in appearance, showing a meshwork of fibrin strands with many mononuclear and polymorphonuclear cells scattered thruout. The tissue around the right cavernous sinus showed an infiltration of polymorphonuclear and mononuclear cells.

The left lateral sinus showed a thrombus similar to that described for the

cavernous sinus. In some places, however, there were the typical fibrin strands with accumulation of white blood cells in columns. There was also a dense accumulation of polymorphonuclear and mononuclear cells, which was in part surrounded by the intact thrombus.

A section thru the clot in the posterior part of the longitudinal sinus showed a thrombus resembling that described in the cavernous sinus.

The occipital sinus and left sinus rectus showed a postmortem clot.

A section of the dura from the left anterior fossa showed a slight purulent exudate on the surface.

There was a slight meningeal exudate consisting of serum, red blood cells, mononuclear cells, and some polymorphonuclear cells.

The anatomic diagnosis was otitis media, causing infected thrombi in both cavernous sinuses and in the left lateral, straight and longitudinal sinuses, and acute cerebral meningitis.

I wish to express my thanks to Dr. M. C. Winternitz, Prof. of Pathology at Yale University, School of Medicine, for permission to report the work done in his laboratory.

PARENTERAL INJECTIONS OF MILK IN DISEASES OF THE EYE.

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This paper discusses the therapeutic principle of parenteral injections of milk, the different views on their action, complications and results in various eye diseases, with report of two cases. Read before the Wisconsin State Medical Society, La Crosse, September 10th, 1920.

The therapeutic aims, based on active immunization, to influence the course of infections by parenteral introduction of the morbid agent into the body, are the essence of specific vaccine therapy. Its action was attributed to the formation of specific antibodies. Further observations, however, were in conflict with this conception. They showed that the results of the vaccination do not depend upon the increased bactericidal action of the blood, but merely upon the reaction of the tissues. Diseases were cured by injections of vaccines of bacteria specific to an entirely different disease, i. e. by heterovaccine therapy. Thus, Darier recommended antidiphtheric serum for the treatment of various inflammations of the eye. Kraus, Luedke, and R. Schmidt saw the efficient principle of heterovaccine in the action of parenterally introduced albumin, foreign to the species.

Instead of the heterovaccines, foreign protein injected in the most different infectious processes, often brought about sudden recoveries. As such a protein, milk was used in various general diseases by Schmidt and Saxl; and by R. Mueller in local inflammations. Mueller and Thanner reported surprising results by milk injections in diseases of the eye. They formerly never obtained, in the treatment of any painful eye affection, such rapid subsidence of pain and photophobia as by the milk treatment in iritis, excepting only the operative treatment of glaucoma. After their recommendation, the milk injections have been employed by numerous authors, and we have reports from several eye clinics on their results in a large series of eye afflictions.

The technic is this: At the average 5 ccm. of fresh milk, boiled for from three to four minutes and cooled to the temperature of the body, is injected sub-

cutaneously into the glutaeal region. Pillat used in the newborn and in children of up to 5 years of age, from 2 to 3 ccm., of from 5 to 15 years from 5 to 8 ccm., and in adults 10 ccm. At first the injections were made into the muscles, but, as the market milk contains abundant microorganisms, which, especially the most violent, cannot be destroyed by boiling for 4 minutes, occasionally deep seated abscesses were encountered. Four hours after injection the temperature rises to 39° C., sometimes 40° and more; and after this maximum falls within four to six hours to normal. If the temperature is very high the patients complain of headache and general malaise, which speedily subside after the cessation of the fever. Hence it is advisable to make the injection in the morning, so that the patient can be under medical supervision during reaction.

The injection may be repeated after 2 days and the dose increased. The subsequent temperatures generally do not reach the same acme as after the first injection. In a rather large percentage of cases albuminuria up to 0.7% was observed, with hyalin casts, epithelium and leucocytes, but disappeared on the second day.

The first few injections are determining for the therapeutic effect. If this is not attained, not much can be expected from a continuation. In general, the treatment is finished with from 5 to 6 injections.

Altho L. Mueller made over 1,000 injections of milk without any complications, a number of authors reported chills, formation of abscesses, anaphylactic symptoms, local and general, herpes labialis, exanthems, hyphema in iritis, protraction of the fever to 3 weeks, rekindling of tuberculous processes, per-

foration of deep ulcers, proteinogenous cachexia, anaphylactic shock; and even anaphylactic deaths (Steiger, Berneaud, Maschler, Holler, Koenigstein, Lubliner, Reiter, Sachs, Schittenhelm and Weichardt). To avoid these, Lubliner recommends to make the second injection not before the 5th day. Jickeli, Holler, Steiger, and others, therefore, emphasize the desirability to find a preparation of known constitution which may be administered in uniform doses. They decidedly warn against the generalization of milk injections as a therapeutic means, on account of the danger of anaphylactic deaths, and recommend great caution in their application.

Instead of milk, which by 4 minutes' boiling is not made sterile, and, if boiled to absolute sterility, is claimed to lose its effect, the Saxon Serum Works of Dresden brought out a preparation under the name of ophthalmosan, which insures sterility. After its injections the fever was less intense. But the therapeutic effects also were less, as the higher the temperature and the more violent the accidental phenomena the more favorable was the effect on the eye. Berneaud, however, recommends the ophthalmosan injection for the general practitioner, Holler advises Merk's deuteroalbumosis; and Szily and Sternberg emulsion of typhoid bacilli in gonorrhoeic ophthalmia.

The mode of action of the parenteral milk injections is not yet sufficiently known. According to Abderhalden the organism reacts to the parenteral injection of albumin, foreign or similar to the species, by the formation of defensive ferment. In proportion to the different organic and inorganic constituents of the milk, and the reactive capability of the body, these must vary. Thus Englaender successfully employed inorganic substances, e. g. salt, in infectious diseases. Berneaud's experiments on the action of the different constituents of the milk are not yet concluded.

Holler attributes great importance to fermentative processes in the action of proteins by which specific curative processes are mobilized, as Luedke proved increase of complements and Heilner of protective ferment. According to Berneaud the action cannot be specific; be-

cause no immunity is attained, as the relapses in eczematous keratitis demonstrate, and the fact that in luetic parenchymatous keratitis the affection of the second eye cannot be prevented by the injection. The inflammatory products are rapidly removed, so that the natural forces of immunity of the organism can fully develop and bring about recovery from the disease. Thus in iritis first the injection and exudations in the anterior chamber disappear. The milk acts as an absorbent, not as a disinfectant.

The increase of temperature is given great importance, on account of the better results from the milk injections the higher the temperatures were. This is in analogy to the favorable influence of intercurrent febrile diseases on the course of inflammatory affections, e. g., the remarkable improvement of trachoma during an epidemic of scarlet fever in 40 children, and of a case of polyarthritis, observed by Huehn. The fever also causes changes of metabolism, blood circulation, and organic functional disturbances. Lindner and others ascribe the astonishing results in gonobrennhea to the deleterious influence of higher temperature on gonococci, the most sensitive ocular bacteria to heat. This corresponds perhaps with the better results of milk injections in gonorrhoeic epididymitis and orchitis than in ordinary gonorrhea, because the urethra has a lower temperature than the trunk. Pillat thinks the effect of higher temperature lies in increased protective power of the organism and the products of disintegration of albumin, whose absorption may be the effective element. The duration of the higher temperature may be too brief to damage the gonococci; and the longest persistence of gonococci in the upper fornix, which in consequence of its protected site has a higher temperature than the other parts of the eye, finally the disappearance of gonococci if only a temperature of 38° C. was reached after the injection, seem to speak against it. Von Thanner and R. Mueller see an important factor, aside from the higher temperature, in the leucocytosis; and R. Mueller in the hyperemia and transudation at the inflamma-

tory focus, corresponding to the experimental anaphylactic shock in animals.

To decide this experimentally, Guist placed, in 2 cases of onesided blennorrhœa, secretion and epithelium scraped from the conjunctiva into 2 test tubes with physiologic salt solution, in the incubator at 37°. After the injection of milk the conjunctiva of the healthy eye was scarified and, when the highest temperature was reached, scrapings from it brought into one tube at 37 degrees. Four hours later the gonococci in this tube were swollen, not well stained with methyl blue. Almost all polynuclear cells were loaded with gonococci, whereas the gonococci of the control tube were scarcely changed, and only exceptional in the leucocytes. The difference was so striking that Guist is inclined to assign the main effect of the milk injections to the increased activity of the cells, and not to the higher temperature alone.

With regard to the therapeutic results, I may here quote from the detailed report by Berneaud from the Eye Clinic in the University of Kiel, on 225 cases, treated with milk injections, viz., 27 of parenchymatous keratitis, 65% eczematous keratitis, 20 of trachoma, 40 of iritis, and 10 of choroiditis. According to Berneaud milk injections exert an undoubtedly favorable influence on inflammations of the eye, with unusually good results in some cases. In parenchymatous keratitis pain and photophobia were relieved only in 50% of the cases. An affection of the second eye could not be prevented. In eczematous keratoconjunctivitis photophobia and pain almost always subsided, and the general condition of the children improved. Relapses, however, could not be averted. In iritis the results were favorable almost without exception. Even severe tuberculous affections of the iris showed remarkable improvement. In disseminated choroiditis vision may be greatly ameliorated as long as the neuroepithelial cells have not been damaged. Ulcerations of the cornea in trachoma were beneficially influenced, but not the trachomatous process itself. Ulcers of the cornea from foreign bodies healed rapidly, and hypopyon readily subsided. If after perforating injuries an infection

set in, it was alleviated by the milk injections. In a case of internal hemophthalmus, with only perception of light the patient could count fingers after 2 injections. Nothing definite can be said on results in sympathetic ophthalmia, but a trial with injections is recommended. Brilliant results may be obtained in ophthalmogonorrhea, so that an attempt with the injections is imperative in every case.

In general, other reports coincide with this (Maschler, Jickeli and others). Elschnig, however, had no results in two cases of blennorrhœa. Others, e. g., Bachstet, saw splendid effects in some cases, in others not. He thinks that some strains of gonococci, e. g., in a series of cases from the same source of infection, may be refractory to the injections. Especially was this the case if gonorrhœa was combined with trachoma (Koenigstein, L. Mueller, Lauber), or if the gonococci occurred in symbiosis with other bacteria, e. g., Xerosis bacilli, Koch-Weeks bacilli (L. Mueller, Pillat). On the other hand, Rosenstein, from his good experiences on 65 cases of trachoma, urges the injections in each case, particularly with inflammatory symptoms. Very favorable is the influence of the injections on the beginning involvement of the cornea in blennorrhœa (L. Mueller, etc.). Uddgren in some cases made the surprising observation that the previously negative or doubtful Wassermann reaction was rendered positive by the milk injections, and recommends them for provocation of the Wassermann reaction.

For illustrating an instance with, and one without, complications after milk injections, I beg to add 2 cases of my own observation.

CASE 1: A boy, aged 19 months, affected with probably miliary tuberculosis, was suffering from phlyctenular kerato-conjunctivitis with violent blepharospasm, rhagades at the temporal canthus, eruptions of the skin of ears, nose and mouth, enlarged cervical and mesenteric glands. Von Pirquet positive. Altho the corneal infiltrations improved under the usual treatment (from March 6, 1920), photophobia and blepharospasm persisted obstinately. I therefore

made, on April 19, 1920, a subcutaneous injection of 5 ccm. of pasteurized milk, boiled for 10 minutes, into the glutaeal region. The temperature rose in the afternoon, but the child seemed otherwise comfortable. The next day an eruption developed on face and body, which was diagnosed by a dermatologist as measles, and the patient was sent home. A day later the condition of the eye was improved, and the, undoubtedly protein, rash had disappeared.

CASE 2: A girl, aged 6 years, affected

with corneal infiltrations, and severe photophobia and blepharospasm which did not yield to treatment, was given an injection of 5 ccm. of milk, boiled for 10 minutes. The result was most striking; the photophobia and blepharospasm subsided the next day.

Finding the results very encouraging, I shall continue to try the injections in appropriate cases, but, for greater safety, I shall boil the milk for at least 10 minutes, which did not seem to impair its therapeutic value.

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SENSITIVITY OF ILLUMINATION SCALE FOR DETERMINING EX- ACT AMOUNT AND PLACEMENT OF CORRECTION FOR ASTIGMATISM.

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This paper, based on work done in the Department of Psychology of Bryn Mawr College, reports the comparative results of the illumination scale and the usual clinic methods in testing astigmatism without and with a cycloplegic, and irregular astigmatism. It was read before the American Ophthalmological Society, June, 1919.

There are doubtless many ways in which sensitivity may be added to the acuity test for the detection of small errors in refraction and in their correction. In connection with the problems which we have undertaken during the past eight years involving modifications and refinements in functional testing, three principles have come to light which can be used very effectively to this end. That is, the eye which suffers from an insufficient resolving power shows the following functional defects. (1) An undue lag or slowness in making the adjustments needed for clear seeing. (2) A marked loss in power to sustain the adjustments needed for clear seeing. And (3) an increase in the amount of light required just to discriminate details in the standard acuity object. The devising of test methods based on the first two of these principles has been treated of in former papers. The third alone will be considered here.

The relation of the illumination scale to the detection of small errors in refraction and their correction may be stated briefly as follows: In so far as the test object is concerned, clearness of seeing depends upon the value of the visual angle subtended and the intensity of the illumination. It follows from this that either the illumination scale or the visual angle scale may be used for the detection of errors in refraction, i. e., in the diagnostic procedure either the illumination may be held constant and the visual angle varied, or the converse.

Since the visual angle scale sustains by convention a 1:1 relation to acuity while acuity changes slowly with change of illumination for all but very low illuminations, the illumination scale possesses the greater sensitivity for the de-

tction of small errors in refraction,—also the greater feasibility of contrivance and manipulation. Used in this way the illumination scale becomes in effect an amplifying scale—somewhat analogous to the use of the tangent scale in detecting small deflections in the magnet system of a galvanometer—and has an advantage in sensitivity in proportion to the amplification. In clinic practice it has been shown to be of particular value in determining the exact amount and placement of the correction of astigmatism.

That is, if the eye has equal resolving power in all meridians, the amount of light required just to discriminate the test object in all meridians will be the same; if the resolving power is not equal, the amount of light required will be different in the different meridians and different by an amount proportional to the amplification represented by the illumination scale. This gain in sensitivity over the clinic methods is needed in particular to determine the exact amount of the correction in case of high astigmatisms and both the amount and exact placement of the correction in case of low astigmatisms.

The checking up of a number of cases shows that the corrections by the clinic methods may be and frequently are off from 0.12 to 0.25 diopter in the strength of the cylinder and, in case of low astigmatisms, from 5 to 20 degrees in the placement of the cylinder axis. While errors of this magnitude may or may not be troublesome in the ordinary uses of the eye—sometimes they are very troublesome indeed and perhaps always tend in time to increase the amount of the defect—they do constitute a much more serious handicap, perhaps an actual disqualification, for work or vocations re-

quiring special ocular proficiencies, e. g., keen acuity, particularly keen acuity at low illuminations; the power to sustain acuity; speed in the use of the eye, especially speed of discrimination and of making the adjustments needed for clear seeing at different distances; etc.

Moreover it is safe to say that a considerably greater amount of light is required as a comfortable and efficient working minimum by the poorly than by the well corrected eye. Indeed our experience with the tricornered relation

produced an increase of only 28 per cent in acuity.

The amplification within the latter range of illumination is doubtless too great for feasibility of application. That is, too wide a range of illumination would have to be used to compensate for the difference in the resolving power of the eye in the poorest and best meridians in the ordinary run of astigmatisms. The range from 1 to 9 meter-candles is, however, quite feasible and the relation between the two scales (visual angle and

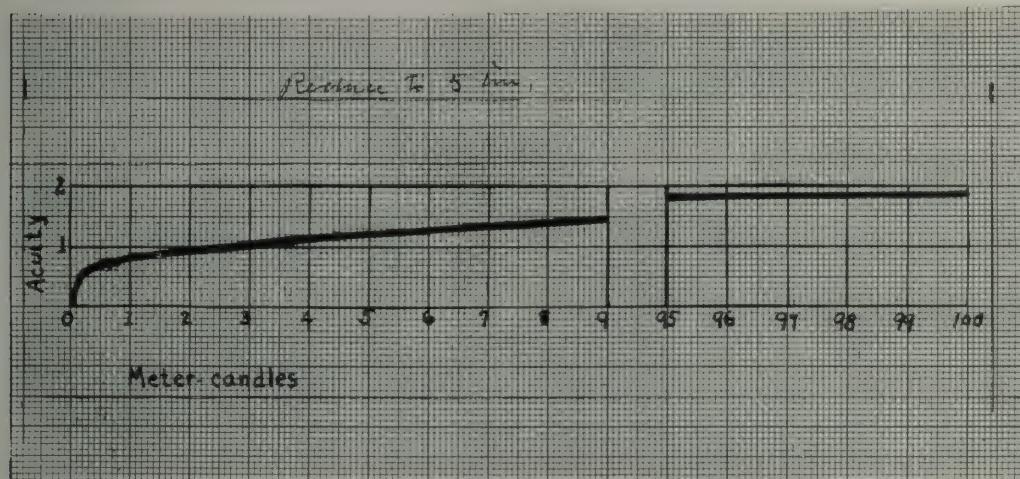


Fig. 1.—Showing the relation of intensity of illumination to acuity (Koenig, 4 observers).

of intensity of light, resolving power and retinal sensitivity to acuity has impressed us with the relative importance of resolving power, in explaining the difference in the amount of light that is required by different people as a working minimum.

The relation of the intensity of illumination to acuity may be illustrated by the curve shown in Figure 1.

This curve represents the average result for four observers, tested by Koenig.¹ In this curve acuity is plotted along the ordinate and intensity of illumination along the abscissa. It will be noted, for example, that a change from 1 to 9 meter-candles, an increase of 800 per cent in the intensity of illumination, produced an increase of only 74 per cent in acuity; and a change of 9 to 100 meter-candles, an increase of 1011 per cent in illumination,

illumination) gives abundant sensitivity. These values fall within the range given by the apparatus described in our former paper,² 0.07 to 9.2 meter-candles. The testing of a large number of cases of astigmatism with this apparatus showed that in the majority of cases the minimum amount of light required for the discrimination of the opening in the broken circle (visual angle, 1 min. at 6 meters) in the most favorable meridian was of the order of 1 to 3 meter-candles; in the least favorable meridian, of the order of 6 to 9 meter-candles.

A convenient apparatus for using the illumination scale for detecting low astigmatisms and small errors in the amount and placement of their corrections was described in a former number of this journal.³ In this apparatus, it will be remembered, uniformity of illumina-

tion of the test surface was secured by projecting upon it the image of an evenly illuminated aperture at the inner end of a projection tube of a lantern or lamp house. In order to secure a uniform illumination of this aperture, the lamp house was lined with opal glass ground on one side and the aperture itself was covered with a slide of ground glass. The source of light was a 100-watt type C Mazda lamp, of the round bulb or stereopticon type with its filament well above the aperture to be illuminated, and the changes of illumination were produced by an iris diaphragm placed immediately behind the focussing lens in the projection tube which reduced the illumination without changing the size or shape of the image.

The test object was a broken circle fastened at the center of a graduated dial, the opening of which (visual angle, 1 minute at 6 meters) could be turned into any meridian that was desired. The angle of turning could be read in terms of the divisions on the dial, which was graduated to correspond to the readings on the trial frames used in office and clinic work. The results given in this paper were obtained with this type of apparatus. They are fairly representative of the large number that have been obtained.

In the testing and demonstration of the sensitivity and serviceability of the illumination method for determining the exact amount and placement of the correction of an astigmatism, the following types of material have been selected. (1) Artificial astigmatisms made with cylinders of low diopter value. In choosing to include artificial astigmatisms in this work it should be understood that we did not consider the artificial astigmatism the exact functional equivalent of the natural astigmatism. We are too strongly impressed with the possibility that the astigmatic eye may progressively acquire power to compensate in part for its defect to be of this opinion. They were selected because we wished to have in one set of cases an exact knowledge of the amount and location of the defect as a check on the determinations made by the test. (2) Natural astigmatisms without a cycloplegic. (3)

Office and clinic cases with a cycloplegic. The difference in result between the most and least favorable meridian or between a true and a false correction have thus far been of considerably greater order of magnitude with than without a cycloplegic, either in case of a natural or an artificial astigmatism. (4) Office and clinic cases, submitted to us by experienced refractionists, in which the apparatus has been used merely to check up corrections already made by the clinic methods, objective and subjective. Among these cases it was comparatively rare to find one in which the minimum amount of light required to discriminate the test object in the corrected meridian was even approximately equal to that required in the other meridians. And (5) irregular astigmatisms. The results of these tests were presented in a former paper.³

For the artificial astigmatisms three cases were used: (a) low astigmatisms produced by weak cylinders; (b) small errors in the placement of the correction of low astigmatisms; and (c) small errors in the amount of the correction of low astigmatisms.

Of the large number of natural astigmatisms tested space will be taken here for the representation of only a few cases.

ASTIGMATISM (WITHOUT A CYCLOPLEGIC).

CASE 1 (age 13 years). R. Correction by clinic methods, + 0.25 cyl., ax. 70°. (Placement of axis could be varied over a range of about 45° and cylinder could be changed to 0.12 diopter without noticeable change in the results by these methods.) With this correction illumination required with opening of circle in meridian of cylinder axis, 0.20 m.c.; at 90 degrees from this position, 0.55 m.c.; difference, 0.35 m.c. or 175 per cent.

Correction by illumination method, +0.12 cyl., ax. 55°. With this correction equal illumination (0.16 m.c.) was required for the discrimination of the test object in all meridians.

Difference in amount of light required for discrimination of test object in least favorable meridian for the two corrections, 0.39 m.c. or 244 percent.

L. Correction by clinic methods, +0.12 cyl., ax. 180°. (Placement of axis could be varied over a range of about 45 degrees without change in result by these methods.) With this correction illumination required with opening of circle in meridian of cylinder axis, 0.12 m.c.; at 90 degrees from this position, 0.21 m.c.; difference, 0.09 m.c. or 75 per cent.

Correction by illumination method, +0.12 cyl., ax. 15°. With this correction equal illumination (0.105 m.c.) was required for discrimination of test object in all meridians.

Difference in amount of light required for discrimination of test object in least favorable meridian for the two corrections, 0.105 m.c. or 100 per cent.

CASE II (age 48 years). R. Illumination required before correction with opening of circle in most favorable meridian, 2.93 m.c.; at 90 degrees from this position, 9.19 m.c.; difference, 6.26 m.c. or 214 per cent.

Correction by illumination method, —0.50 cyl., ax. 105°. With this correction, equal illumination (2.93 m.c.) was required for the discrimination of the test object in all meridians.

L. Illumination required before correction with opening of circle in most favorable meridian, 2.35 m.c.; at 90 degrees from this position, 5.25 m.c.; difference, 2.90 m.c. or 123 per cent.

Correction by illumination method, +0.37 cyl., ax. 137°. With this correction, equal illumination (2.35 m.c.) was required for the discrimination of the test object in all meridians.

IRREGULAR ASTIGMATISM.

CASE I (age 32 years). L. Illumination required with opening of circle turned right, left, and down, 0.97 m.c.; when turned up, 5.25 m.c.; difference for two halves of vertical meridian, 4.28 m.c. or 441 per cent.

ASTIGMATISM (WITH CYCLOPLEGIC).

CASE I (age 25 years). R. Correction by clinic methods, +0.50 S. ⊖ +0.37 cyl., ax. 15°. With this correction, illumination required with opening of circle in meridian of cylinder axis, 2.46 m.c.; at 90 degrees from this position, 9.19 m.c.; difference, 6.73 m.c. or 274 per cent.

Correction by illumination method, +0.5 S. ⊖ +0.37 cyl., ax. 30°. With this correction, equal illumination (1.61 m.c.) was required for the discrimination of the test object in all meridians.

Difference in amount of light required for discrimination of test object in least favorable meridian for the two corrections, 7.58 m.c. or 471 per cent.

CASE II (age 35 years). R. Corrections by clinic methods, —0.62 cyl., ax. 180°. With this correction, illumination required with opening of circle in meridian of cylinder axis, 2.32 m.c.; at 90 degrees from this position, 9.19 m.c.; difference, 6.87 m.c. or 296 per cent.

Correction by illumination method, —0.75 cyl., ax. 180°. With this correction, equal illumination (2.09 m.c.) was required for the discrimination of the test object in all meridians.

Difference in amount of light required for discrimination of test object in least favorable meridian for the two corrections, 7.10 m.c. or 339 per cent.

ASTIGMATISM (CHECKING UP OF GLASSES).

CASE I (age 42 years). R. Correction by clinic methods, —0.50 S. ⊖ —0.37 cyl., ax. 10°. With this correction, illumination required with opening of circle in meridian of cylinder axis, 2.34 m.c.; at 90 degrees from this position, 7.35 m.c.; difference, 5.01 m.c. or 214 per cent.

CASE II (age 45 years). R. Correction by clinic methods, —0.25 S. ⊖ —0.50 cyl., ax. 125°. With this correction, illumination required with opening of circle in meridian of cylinder axis, 2.02 m.c.; at 90 degrees from this position, 6.67 m.c. in one half of meridian, 7.82 m.c. in other half; difference, 4.65 m.c. (230 per cent) and 5.80 m.c. (287 per cent). Astigmatism may be slightly irregular.

L. Correction by clinic methods, —0.50 cyl., axis 80°. With this correction, illumination required with opening of circle in meridian of cylinder axis, 0.97 m.c.; at 90 degrees from this position, 5.62 m.c. in one half of meridian, 6.23 m.c. in other half; difference, 4.65 m.c. (479 per cent) and 5.26 m.c. (542

per cent). Astigmatism may be slightly irregular.

In the above reports of cases we have, for the sake of brevity, used the term clinic methods, instead of specifying in greater particular the tests employed. Where we have made the comparison ourselves between the illumination method and the methods ordinarily employed in office and clinic work, we have used the acuity method, the astigmatic charts, the point of light test and the ophthalmometer (in some cases). The acuity method was used in different ways. In one, patterned after a procedure much employed, some character difficult of discrimination and taxing the resolving power of the eye in as many meridians as possible, such as the letter B, was selected. It was brought to or near to the threshold of discrimination by fogging, by changing the visual angle by the use of a graded scale of illumination, etc., in order to make the conditions favorable to a sensitive judgment and the strength and placement of cylinder were determined which gave the maximum clearness of seeing.

In order to decide between doubtful determinations other acuity tasks or tests were imposed. That is, we not only used the acuity test as it is ordinarily employed, but have endeavored in many ways to add to its sensitivity and precision without sacrificing its distinctive features. However, in collecting the data for the comparison we have preferred to lay the chief stress in the cases in which clinic testing has been done by practicing ophthalmologists, who have very willingly given us their cooperation. In all cases but one which have been submitted to us for testing, the physician himself has accompanied the patient, looked after the cycloplegic and has inspected every step of the test procedure, the principle of the apparatus and method having previously been made familiar to him. Care was taken on both sides that a fair comparison of sensitivities was made.

Doubtless the apparatus can be used in different ways depending upon the experience and preference of the operator. For example, the minimum amount of light required to discriminate the test

object could be determined for one meridian and the setting of the light control be held constant while the test object is rotated into the different meridians, the observer being required to judge in each case whether the same or more or less light would be required for its discrimination. This would serve as a rough indication of whether or not the eye is astigmatic.

The exact meridian of the defect, that is the meridian in which the greatest amount of light is required to discriminate the opening in the circle, could be determined through a series of settings of the test object and the light control. The placement of the correction having been determined, its amount could be found by the strength of cylinder required to render the minimum illumination needed to discriminate the test object the same for all meridians, or more roughly speaking for the meridian of the defect and at 90 degrees either way from this position.

A quicker and more feasible method, however, is first to make an approximate determination of the amount and placement of the correction by the clinic methods and employ the illumination scale only for a more precise determination. In using this method as a refinement on the clinic methods, the procedure we ordinarily employ is as follows: The patient's eye is fitted with the strength and placement of cylinder indicated by the clinic tests; and the minimum amount of light required to discriminate the opening in the circle is determined in four positions, two in the meridian of the cylinder axis and two in the meridian at right angles to this. If the minima are not equal in these four positions, the cylinder is shifted and the determinations are made again in the four positions, the opening of the circle always being in the meridian of the cylinder axis and the meridian at 90 degrees from it. As a precautionary measure other positions may also be tried. If no placement of the cylinder is found which gives equal minima for the four positions, the strength of the cylinder is changed. The strength and placement of cylinder which require both equal and the smallest amounts of light for the four positions

of the test object are accepted as the final correction.

The apparatus can also be used to advantage with astigmatic charts of the sunburst type, the radial lines of which are no more than 5 degrees apart, in the preliminary approximate determination of the axis of the defect. In this case the procedure is to reduce the illumination until only one or perhaps two of the lines stand out clearly. This would give a sensitivity roughly speaking of about 5 degrees, and requires little more time than is usually consumed in the use of the astigmatic charts.

In our own work we have found out that the apparatus would be very helpful even if it were used only to check up the corrections made by the clinic methods, and were not employed further as an aid in finding out the exact amount and placement of the correction. For example, it requires but a very few minutes to determine with the apparatus whether any given correction equalizes or levels up the resolving power of the eye in the different meridians. The advantage of a checking method which is definite and at the same time feasible can readily be appreciated by any one who has tried to decide by the present meth-

ods in any wide range of cases just what should be the exact amount and placement of the correction of an astigmatism.

The method has its chief value perhaps in those cases in which it is particularly difficult to make a decision by the clinic methods, that is, in determining the exact amount of the correction in cases of high astigmatism and both the amount and placement of the correction in case of low astigmatisms. The simple character of the judgment, namely, the mere indication of the direction in which the opening of the circle points, instead of the more difficult task of deciding under the more or less rough conditions of office and clinic testing, whether this or that placement or strength of cylinder gives the clearer vision, together with the objective check on the correctness of each judgment, also contributes to make the method especially valuable in case of children and the subjective, unintelligent and untrained type of adult. A further advantage of the method as worked out in connection with the present apparatus is its great sensitivity for the detection of irregular astigmatisms. The lack of satisfactory tests for this troublesome defect is generally conceded.

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PERIMETRIC CHART USED FOR MEASURING RETINAL LESIONS.

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The chart here referred to serves to indicate the actual size of retinal lesions corresponding to any given scotoma or narrowing of the visual field. The need for this is pointed out and other methods considered.

This paper is presented in an endeavor to show the practicability and usefulness of what is thought to be an improvement over our present methods for estimating more accurately the size and location of retinal lesions—an improvement that

scientific if the size and location could be given in millimeters.

In an attempt to facilitate measurements of this kind Epkens and Donders made an elaborate ophthalmoscope, with a micrometer attachment which was used

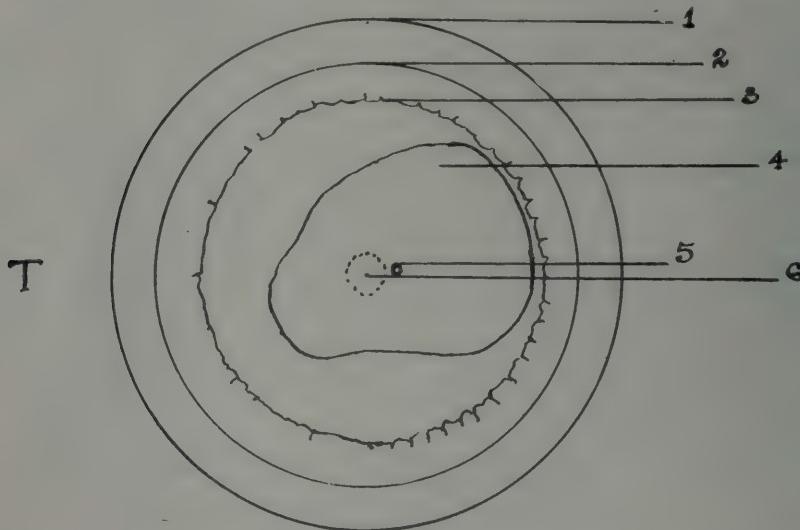


Fig. 1.—Diagram of projection of inside of eye, 22 mm. diameter. 1: Center of cornea. 2: Circle corresponding to attachment of iris, 6 mm. from center of cornea.¹ 3: Ora serrata, irregular shape and sharp projections directed toward corona ciliaris.² 4: Sensitive portion of retina, the normal average field. 5: Optic nerve. 6: Area centralis, center of which is the fovea.²

might be of clinical value, in that we are enabled by its use, to picture in the mind's eye, these conditions in their actual size.

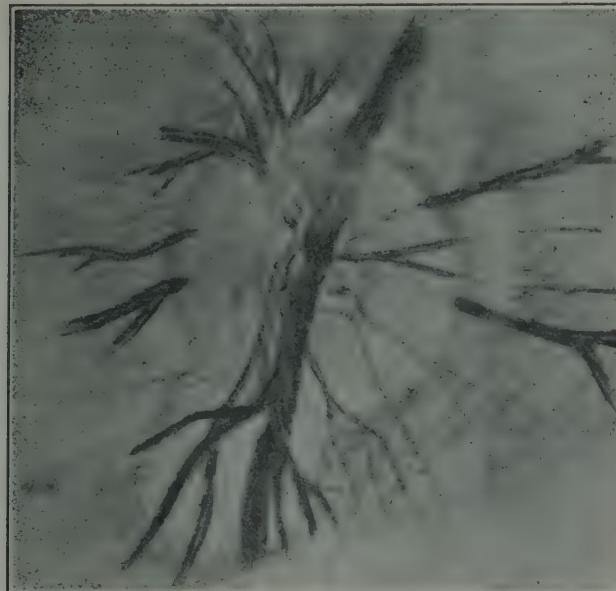
The real size of the fundus, being seen highly magnified, is seldom appreciated. It requires an imagination to think of the disc as being only about 1.5 millimeters in diameter, and the fovea only 3¹ or 3.5 millimeters² away from it. An observer will define a lesion as being "about the size of a dime," by comparison with the size of the disc, or that it causes a scotoma of so many degrees. It is felt that the representation would be more

for calculating the size of the parts seen. Schneller made a similar attachment for measuring the inverted image, which could be applied to any ophthalmoscope. Zander⁵ gives complete descriptions and illustrations of both the above devices, which were made very shortly after Helmholtz developed his first ophthalmoscope. Frost and Stephenson⁶ designed a fundus-gauge, consisting of a rectangular network of fine wires, which when attached to an ophthalmoscope, threw its shadow on the fundus, thus mapping it out into squares. In 1886, Dr. Thomas Reid of Glasgow, designed an electric

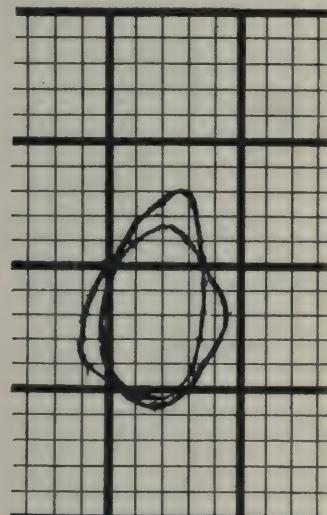
ophthalmoscope with a prismatic reflector and a micrometer scale, an image of which was projected on the fundus.⁷

There are several methods by which a certain area on the retina may be estimated after being charted by the aid of a perimeter or campimeter. The formula most often used and which needs no ex-

portion. For example, take an object 66 cm. in size and 33 cm. in front of the nodal point. By either of the above methods the size of the retinal image would be twice the distance of the nodal point from the retina, or 30 mm. This object would lie within an angle of ninety degrees and the opposite angle within the



A



B

Fig. 2.—A. Opaque nerve-fibres, O. S. B. The record, made on Bissell chart, with lines 1° apart and equal to $\frac{1}{4}$ mm. on the retina, making the reading easy. The inner oval is the outline of the blind spot of the right eye, which is normal. By inverting the reading it will be seen that the greatest extent of interference with retinal function is below, about $\frac{3}{4}$ mm. Vision O. U.=6/5.

planation is that the size of image =
15 mm. \times size of object

distance of object from nodal point. If this method is used for calculating the actual size on the retina of one degree on the arc of a McHardy perimeter, it will be found to be .263 mm.; on the Peter campimeter one degree corresponds to .253 mm.; and on a Bausch and Lomb stereocampimeter, .247 mm.

Another way would be to multiply the tangent of the angle by 15 mm. For example, the tangent of an angle of ten degrees is .1763, multiplying this by 15 mm., we have 2.6445 mm. on the retina, corresponding to ten degrees in the field.

These methods are not mathematically correct and can be used only for a small

eye being the same, would make the image cover $\frac{1}{4}$ of the circumference of the inner surface of the eye. If we should consider 30 mm. as the distance covered on the retina by this image, and since it covers $\frac{1}{4}$ of the whole circumference, lying within an angle of ninety degrees, then the whole circumference would be four times as great or 120 mm. This cannot be, as it would make the inner diameter of this globe over 38 mm. It can thus be seen how these methods are not applicable to a large portion of the retina as they would always give a greater area than the actual size of the retina involved, the ratio being 4 to 3.

Another line of reasoning which altho it has no practical value, may be mentioned because it seems interesting. The

macular cones vary from .0025 mm. to .003 mm. in diameter,³ and correspond to a visual angle of one minute. In order to find the number of cones in one degree, we multiply the diameter by 60. This would give us the distance on the retina corresponding to one degree in the field if the macula were flat; but this is always a depression, oftentimes conical. In order to make it easy for calculation, it may be considered at the fovea, hemispherical, which is perhaps a fair average. Therefore, if the diameter of the cone is multiplied by $60 \times 3.1416/2$ the result is the distance on the retina corresponding to one degree in the field.

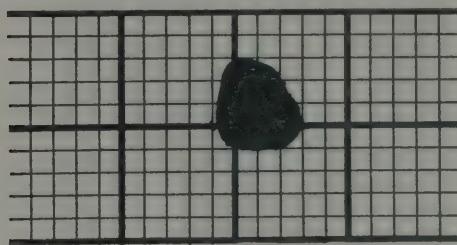


Fig. 3.—Central atrophic choroidal spot, charted on Bissell Record Card. The light lines are 1° apart and equivalent to $\frac{1}{4}$ mm. on the retina. In describing a case of this kind it is necessary only to give the size and location, without the bother of submitting the chart.

This result varies from .233 mm. to .282 mm., an average of .257 mm.

The modified chart suggested in a previous paper⁴ would eliminate the necessity of any calculation whatever. In this article it was reasoned that if it were not for the obstruction offered by the nose brow and cheek, and if the retina were sensitive all around as far forward as at its most anterior attachment, the normal field of indirect vision would be circular in outline and extend ninety degrees in every direction. Twenty-two millimeters was taken as a working average of the inside diameter of the globe. This was multiplied by 3.1416 to find the circumference from which was deducted one third for the anterior segment and the result taken as the diameter of the

retina if it could be projected into a flat circular disc.

The diameter of this flat circular disc was divided by one hundred and eighty, the number of degrees in the field which it covers and the conclusion was reached that each degree was equal to .255 mm., or about one fourth of a millimeter on the retina. On the basis of this theory any existing perimetric or campimetric chart could be so modified by placing on it a series of lines, four degrees apart in the horizontal and vertical directions, that it would be made into an actual plan of the retina, drawn to scale, the squares each representing one square millimeter on the fundus.

By taking the field or mapping out the blind spot or scotomata with any perimeter or campimeter and making the record of such on this modified chart, the size and location could be seen at once and without need of reckoning. As the modification does not in any way interfere with the readings in degrees, the new chart may be used in place of the old one, whether or not the scale is read. Charts, such as the Lloyd or Bissell, being marked in squares of one degree, which correspond to $\frac{1}{4}$ mm. on the retina, could not be changed except that instead of every fifth line, the fourth line be made heavy, making the large square equal to a square millimeter on the retina.

The method of projection used for the chart is shown in Figure 1, as it would be applied to the whole inside of the globe. The measurements are what might be considered fair averages and the scheme is drawn actual size. The few simple cases are shown merely as an illustration of the practicability and clinical advantage of the method suggested.

In conclusion, it might be said that, for practical purposes, as the results of the different methods of estimation vary so very slightly, whether or not the chart is used, four degrees in the field can be considered almost exactly equivalent to one millimeter on the retina.

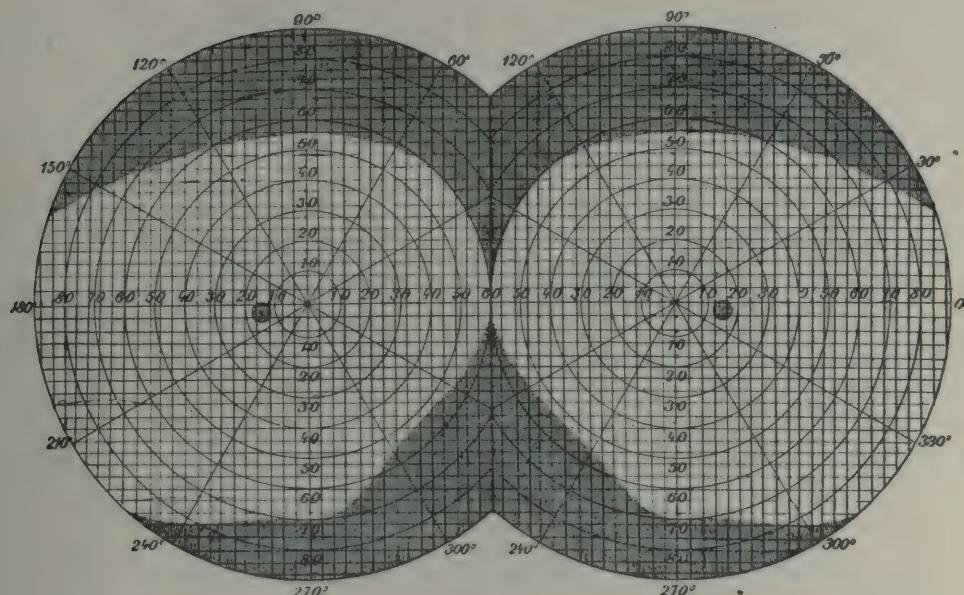


Fig. 4. Modified chart for recording fields. The series of vertical and horizontal straight lines are placed at a distance equivalent to one millimeter on the retina.

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THE MEASUREMENTS OF THE NASAL CANAL ACCORDING TO THE RACE.

JUAN SANTOS-FERNANDEZ, M.D.,

HAVANA, CUBA.

This paper presents tables showing the relative frequency of eye diseases in Cuba, especially the frequency of lacrimal disease in different races; and in comparison of whites and negroes. It also gives the results of a series of measurements of the lacrimal canal in full blooded negroes and whites, and points out the anatomic causes of greater frequency of lacrimal obstruction among the whites and mulattoes than among the blacks.

The subject is ever new, altho we have written upon it many years since (Anthropological Society of Cuba, May 5,

and this is a reason why the negroes are less prone to suffer from diseases of the lacrimal passages.

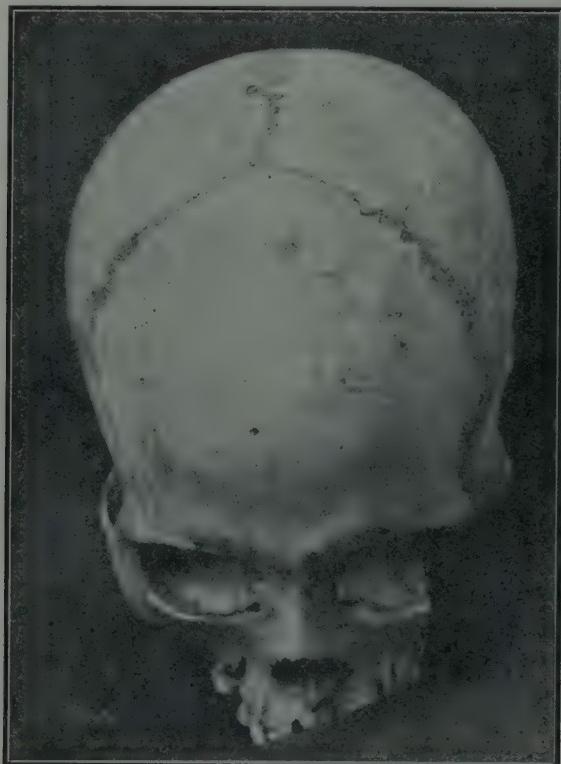


Fig. 1.—Photograph of skull of white showing entrance of bony lacrimal canal.

1878.—Bulletin of the Society No. 3, pages 49-52); and we believe that in such a great country as the United States, with one-tenth of its population black, it would be interesting either to confirm or disprove this view we have held for many years: that the nasal canal in the negro race is wider than in the whites;

I submit some photographs of skulls prepared by Dr. José A. Presno, professor of Anatomy in the University of Havana, as well as some sketches and statistics of lacrimal diseases in the different races in Cuba. But it might be well here to state that we are only studying this subject from a clinical stand-

point; and shall not try to enter into arduous sociologic problems, that we do not wish to discuss.

During my sojourn in Europe, as a student before 1875, I was really surprised with the large number of lacrimal affections seen in Spain and France, especially the former, mostly due to ob-

My first clinical investigations included a limited number of cases. Later researches covered a period of 28 years, from April, 1875, to December, 1902. During that time I was able to see 37,290 cases of ocular diseases. The lacrimal cases numbered 773, of which there were 238 cases affecting the nasal canals.

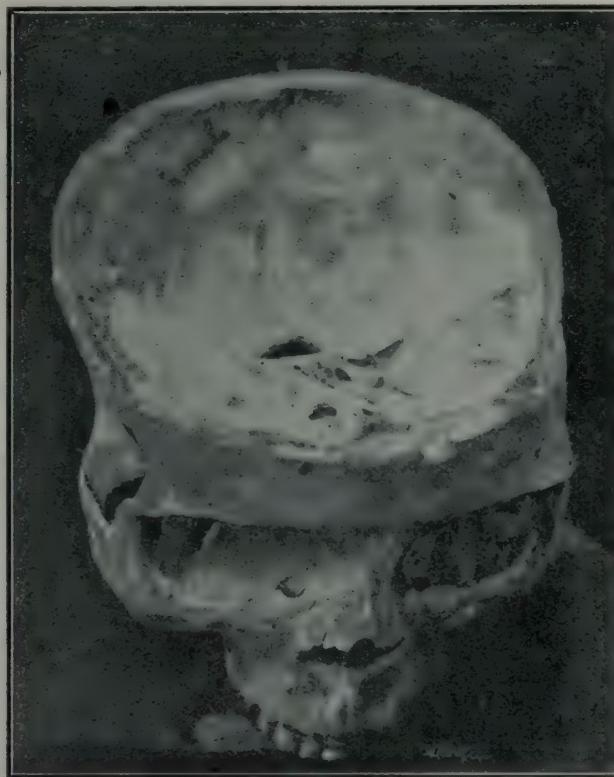


Fig. 2.—Photograph of skull of negro showing entrance to bony lacrimal canal.

struction of the tear passages. On my return to Cuba, I very soon saw that lacrimal diseases were not so frequent as in Europe, a fact I thought due to the large percentage of negroes and mulattoes in the native population. I then maintained the theory which was not then accepted, chiefly because I was not able to accompany it with the proper anatomic facts, which later I was able to obtain.

The study of new cases that even more confirmed my original ideas inclined me to go into the proper anatomic studies on the cadaver, and I was able to prove that I was right in my belief.

Both sides were affected in 57 cases, the right side only in 88 cases, and the left in 93 cases. There were 128 men and 110 women.

Among the 773 cases, there were 350 cases of chronic and 68 cases of acute dacryocystitis, or 418 in all; 45 cases had both sacs affected, 172 cases only the right side, and 201 the left. Regarding the sex, 192 were men and 226 women.

We tried to dissect fresh craniums of African negroes, a hard task because by that time slavery had been extinct for many years. It would have been less difficult if we had limited our investigations to native born negroes.

From an anatomic standpoint, the sac and nasal duct are a continuous passage for the emptying of the tears into the nose. The measurements of this naso-lacrimal canal are reported in this paper. All our measurements have been taken in subjects recently dead; after having removed the soft tissues of the orbit and

From the results obtained, as shown in the accompanying charts, we can state the following conclusions:

1. That the lacrimal canal is longer in the white race than in the negro.
2. Negroes have a wider lacrimal canal than whites.
3. The distance that separates the

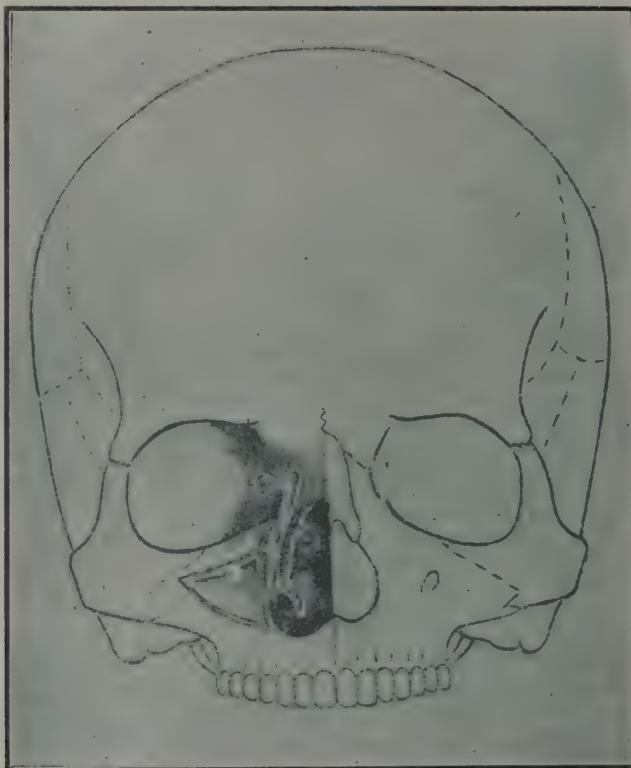


Fig. 3.—Diagram of skull and lacrimal canal in a white.

after having resected the outer portion of the maxillary sinus. In this way, after laying open the naso-lacrimal passage, we have recorded in order, the length and width of the canal vertically, as well as from before backwards, and the disposition of its internal orifice.

The material employed consisted of 24 corpses used in the anatomy classes in our School of Medicine; 15 were of white men and 9 of negroes. The cases were thus selected because a comparative study was desired. No mulattoes were included in these groups, only pure whites and pure negroes.

lower orifices from the two canals is greater in negroes than in whites, this being the cause of the lower orifice of the conduit in relation to the upper being almost always outward in the negro; a fact that could be expected on account of the greater nasal index of the negro.

4. In the blacks the direction of the lacrimo-nasal canal tends to follow a direct line. The double bend in the lateral and antero-posterior is less marked than in the whites.

5. The lower orifice of the naso-lacrimal canal corresponds in the negro to the roof of the inferior canal of the nasal

fossa; being much larger and more rounded than in white. In the white race this lower opening is narrow, more oval, and corresponds to the outer wall of the canal in almost all cases. (See Figs. 1 and 2.)

Besides the investigations on the 24 cadavers that served for the comparative

as compared with its narrowness as well as the reduced nasal index in the white.

We believe it justified, in view of the above results, to draw the following conclusions:

1. The nasal canal is longer and follows a more tortuous course in the white races. This explains the greater tendency

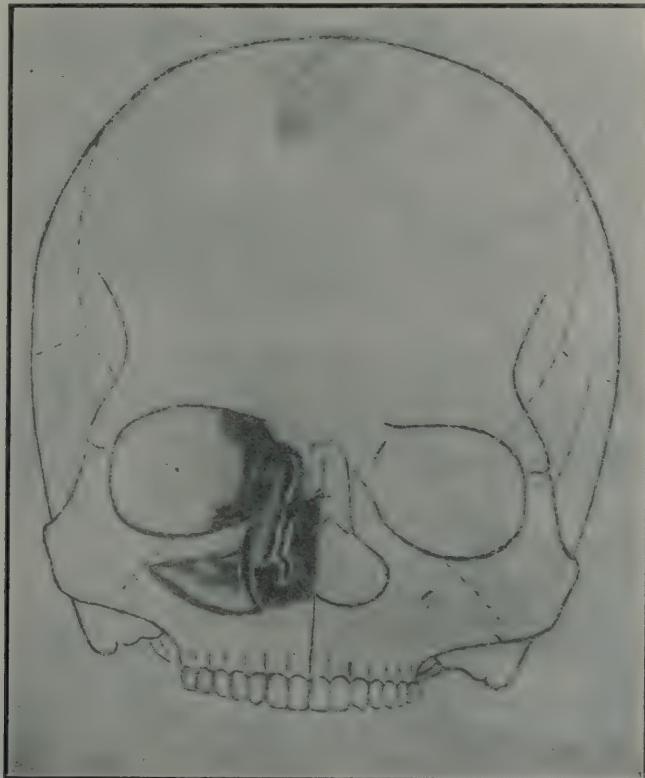


Fig. 4.—Diagram of skull and lacrimal canal in negro.

measurements, one can see in the chart of whites and blacks, that there are two more examples. One corresponds to a white woman and the other to an African negro of the Lucumi tribe. In both is clearly seen, (Fig. 3, obtained from the direct photograph), the greater amplitude of the opening in the negro,

to obliteration or narrowing of its lumen in affections of the lacrimal passages.

2. The nasal canal in the negro is wide and follows a straight course; this explains its becoming obliterated less frequently than in whites, and the rarity of sac and duct diseases in that race, as compared with whites or even mulattoes.

TABLE I.
EYE DISEASES ACCORDING TO RACE AND NATIONALITIES.

Races and Nationalities.

White Race		Races and Nationalities.																																										
		Lacrimal Passages.			Sclera.			Eyelids.			Muscles and Nerves.			Conjunctiva.			Cornea.			Iris.			Lens.			Vitreous.			Choroid.			Retina and Optic Nerve.			Refraction.			Accommodation.			Globe.		Orbit.	
Spaniards.	920	41	3	56	22	154	221	49	144	18	23	61	156	85	13	30	2																											
Cubans.	1,980.	49	9	166	97	398	522	55	263	30	61	168	251	45	57	3																												
Canary Islands.	162.	13	—	—	4	28	39	7	33	2	5	29	8	2	6	3																												
Latin Americans	Europeans	Latinos.	30	—	—	—	8	7	1	4	1	—	5	3	—	1																												
Anglo-Saxons.	17.	—	—	—	1	2	2	—	4	—	—	3	—	2	—	—																												
Latin Americans	Americans	Latinos.	22	—	—	—	5	2	3	—	4	4	3	—	—	—																												
Anglo-Saxons.	9.	—	—	—	—	—	3	—	—	2	—	2	—	—	—	—																												
Mulattoes	Mulattoes.	181	2	7	5	8	36	71	6	10	1	2	25	11	2	2	1																											
Negroes	Cuban Negroes.	352	6	7	15	14	36	140	12	26	4	11	70	12	9	21	2																											
Chinese	African Negroes	—	1	—	5	2	12	19	1	22	1	8	32	2	—	3	1																											
Chinese	Chinese	—	—	3	—	12	23	—	2	—	1	4	1	—	5	—	—																											

TABLE II.

NUMBERS OF PATIENTS TREATED FROM APRIL, 1875, TO DECEMBER, 1902: 37,290

	Races.												Sex.	Age.	
	Whites.				Negroes				Sex.						
	Cubans.	Spaniards.	Europeans.	Canary Islands.	North Americans.	South Americans.	Cubans.	Africans.	Mulattoes.	Chinese.	Mexicans.	Men.	Women.		
Deviation of the lacrimal puncta	7	6	...	...	...	...	...	...	...	...	...	13	1	0 to 1 year.	
Obstruction or narrowing of the puncta	15	10	...	12	1	...	1	...	...	...	...	30	11	1 to 5 years.	
Narrowing of the canaliculi	15	4	1	...	...	...	...	...	...	2	...	10	9	5 to 15 years.	
Acute dacryocystitis	14	32	2	3	...	...	3	...	6	...	...	31	37	15 to 25 years.	
Chronic dacryocystitis	22	106	3	21	1	2	16	2	32	...	3	161	189	25 to 50 years.	
Lacrimal fistulae.	14	19	1	3	...	...	1	...	5	...	15	28	1	50 to 80 years.	
Affections of the nasal canal	105	97	2	18	4	1	4	1	5	...	1	128	110	80 to 100 years.	
												1	...	Both Eyes.	
												13	...	Right Eye.	
												17	...	Left Eye.	

TABLE III.

WHITES.

No.	Age.	Birth.	Length of the Duct.	Diameter	
				Of the Sac.	Of the Duct.
1. Man	30	Spain	27 m.m.	4 m.m.	3 m.m.
2. Woman	33	Cuba	26 m.m.	3 m.m.	2½ m.m.
3. Woman	49	Cuba	26 m.m.	3½ m.m.	3 m.m.
4. Man	54	Cuba	28½ m.m.	4½ m.m.	3½ m.m.
5. Man	39	Cuba	27 m.m.	3½ m.m.	2½ m.m.
6. Man	36	Cuba	27½ m.m.	3½ m.m.	3 m.m.
7. Man	56	Spain	26½ m.m.	4 m.m.	3 m.m.
8. Man	52	Cuba	28 m.m.	3½ m.m.	2½ m.m.
9. Woman	56	Cuba	27 m.m.	4 m.m.	3 m.m.
10. Woman	67	Spain	27 m.m.	4 m.m.	3½ m.m.
11. Man	25	Cuba	27½ m.m.	4 m.m.	3½ m.m.
12. Man	24	Cuba	28 m.m.	3 m.m.	3½ m.m.
13. Man	25	Cuba	28 m.m.	3½ m.m.	3 m.m.
14. Man	23	Mexico	27 m.m.	4 m.m.	3½ m.m.
15. Woman	60	Spain	28 m.m.	4 m.m.	3½ m.m.

NEGROES.

No.	Age.	Birth.	Length of the Duct.	Diameter	
				Of the Sac.	Of the Duct.
1. Man	65	Africa	26 m.m.	5 m.m.	4½ m.m.
2. Woman	80	Africa	25½ m.m.	5½ m.m.	4½ m.m.
3. Man	90	Africa	26 m.m.	6 m.m.	5 m.m.
4. Man	65	Africa	26 m.m.	5 m.m.	4½ m.m.
5. Woman	82	Africa	26 m.m.	5½ m.m.	4½ m.m.
6. Woman	80	Africa	25½ m.m.	4½ m.m.	3½ m.m.
7. Woman	60	Africa	25 m.m.	6 m.m.	5 m.m.
8. Woman	60	Africa	26½ m.m.	5 m.m.	4½ m.m.
9. Woman	70	Africa	27 m.m.	5 m.m.	4 m.m.

TABLE IV.

Number of eye cases: 32,290. Number of lachrimal diseases, 773. Affections of the duct, 238.

Whites.		Races.				Sex.		Age.	
Cubans.	Spaniards.	Europeans.	Canary Islands.	North Americans.	South Americans.	Africans.	Negroes	Men.	Women.
105	97	2	18	4	1	1	4	5	128 | 110 | 1 | 13 | 19 | 47 | 122 | 36 | ... | 57 | 88 | 93

Percentage of cases of nasal canal diseases as compared with the total numbers of patients treated: 0.63 per cent

Percentage of cases of nasal canal diseases as compared with all cases of diseases of the lacrimal passages: 30 per cent.

Percentage of white patients of the nasal canal, as compared with the total number of cases: 0.60 per cent.

Percentage of white patients of nasal canal, as com-

pared with total number of cases of lacrimal disease in all races: 95 per cent.

Percentage of negro patients of the nasal canal, as compared with white patients of the nasal canal: 2.20 per cent.

Percentage of negro patients of the nasal canal, as compared with the total number of cases: 0.01 per cent.

Percentage of negro patients of the nasal canal, as compared with the total number of cases of lacrimal diseases, in all races: 2.10 per cent.

PREPARATION OF OPHTHALMOLOGISTS FOR GROUP PRACTICE

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ROCHESTER, MINN.

This paper from the Section on Ophthalmology of the Mayo Clinic emphasizes the value of group practice and the importance of ophthalmology in it. It is believed that future advances in ophthalmology will be greatest along medical lines, and therefore medical ophthalmology is especially needed for group practice. The proper training for this work must include two or three years of special opportunities and sound instruction. Presented before the American Academy of Ophthalmology and Oto-Laryngology at the Kansas City meeting, October, 1920.

The formation of clinical groups by physicians for the diagnosis of disease and the treatment of patients is one of the newer features of medical progress. The forces behind this movement have been active since the beginning of specialization, in fact they originated in specialization, and have gained power with each new discovery and each bit of scientific advancement. Specialization in medicine became necessary when the fields of investigation of disease processes in man were extended by the invention of optical instruments and the development of the various branches of chemistry. The invention of the compound microscope opened the way to all our knowledge of histology, histopathology, and bacteriology, and incidentally revolutionized the conception of disease transmission. From the ever widening fields of chemistry and biology came new and practical methods of investigation and examination of body fluids and secretions, and rules for their application to the problems of medical practitioners were instituted.

Medical men ever have been quick to grasp tools from scientific discoveries in whatever field they may be found. Men who had been educated and trained in the practice of medicine voluntarily shut themselves off from actual practice and devoted their time and talents to the investigation in the laboratory of influences bearing on the cause and transmission of disease in order that thru greater devotion to a limited field they might add materially to the science of medicine.

The laboratory service now requires the full time of men of high grade intelligence, of liberal acquaintance with

fundamental sciences, and wide knowledge of the advances in clinical medicine and surgery. All are familiar, of course, with the development of laboratories and all recognize their usefulness. Methods of physical examination have been improved by checking physical findings with laboratory findings. "The function of the clinical laboratory worker is to aid the ward worker. The findings of the former are seldom conclusive, and must be interpreted in the light of the ward findings; especially is this true now that functional diagnosis is the goal."¹ No one will attempt to estimate the distinct value of laboratory training in our interpretation of bedside observations, but no one who has had laboratory training denies the miserable darkness thru which he would have to grope had he not had it. The pathologist is not indispensable to the surgeon, and the physiologic chemist is not needed in the majority of cases studied by the internist, but the aids to diagnosis provided by what the pathologist and chemist have taught us are constantly employed to make clear the significance and relationship of symptoms and signs of disease that would otherwise remain obscure. Let us deny that we are bound to the laboratory, but admit that we are better physicians because of what we learned in the laboratory. Let us admit that we learned in the laboratory because someone before us had limited his field of investigation that he might develop it the more, and we, thereby, conceive the value of specialization.

The study of fundamental sciences and their application to health problems early became a specialized feature in the study of disease. Development of the

fundamental sciences gave new methods of study of clinical problems. Physicians then limited their practice to fields in which by employment of highly specialized knowledge they had become more proficient. Altho their practice was limited their study was broadened. Practitioners in special fields spend more time and study in preparation for their work than is required for general practice. Clinical specialties, then, are not deviations from general medicine; they provide ways and means for better practice.

The first division of general medicine into laboratory, medical, and surgical fields, was quickly followed by further divisions until now the list of specialists has become quite long. Yet the basis on which such divisions have been made is obvious in the light of the time required to master the technic of a subject and keep abreast of the special advances, to say nothing of adding to the knowledge we already have by carefully planned and efficiently executed research.

Specialism, as it is practiced today in ophthalmology, otology, neurology, urology, and other well established branches of medicine, needs no argument for justification. No practitioner claims to be equally versed and proficient in the various departments of medical practice. He has come to rely on the opinion of specialists for the diagnosis of the more obscure diseases of his patients, and often of their treatment. The field of study of each specialist is, however, not confined to the organ or system upon which he prefers to specialize. The condition of the kidney is of importance to an expert in cardio-renal disease, the teeth to the gastro-enterologist, and the eyes to the neurologist; in fact all specialties are so interwoven that the examination in all departments is of value in complicated or severe illnesses. The patient's general physician alone cannot hope to bring to light the early changes that bear upon the patient's condition, so it has become quite common to have a patient go from one specialist to another for examination and opinion.

With specialism thus justified the next step toward better service is the association of competent specialists. An oph-

thalmologist may report to an internist that his examination of the patient who was so kindly referred to him reveals the fact that the patient has a diplopia and lowered visual acuity. He may go even further than that. He may report that the patient has a paralysis of an external rectus muscle and a neuroretinitis, and that he has tested the patient's refraction and prescribed glasses. But does that satisfy the internist? Hear what he says:² "Seldom in their reports to us of patients we refer to them do ophthalmologists note how sensitive or anesthetic is the macular region when a ray of light is thrown on it. We always test that for ourselves, and it sometimes helps us in determining by further examination some past forgotten illness. It is very seldom that they report on the stippling of the macular region which dates back to a nephritis of pregnancy years ago. It is seldom that they note the slight traces of an old neuroretinitis."

The opinion of an ophthalmoscopic picture given by an ophthalmologist will be weighed by the internist and credited in the light of what he knows of the skill behind that opinion. So an internist usually selects one oculist to whom he sends his cases. The consideration of the specialist's opinions is the ground work of group diagnosis. Such diagnosis is practiced daily in our hospitals. The recommendation of the College of Surgeons that hospital staffs have frequent conferences is another movement in the direction of group diagnosis.

It is significant that many clinical groups are made up of men who served in camps or base hospitals of the army during the world war where they learned to contrast the value of cooperative effort in professional achievement with the rival practice in private as a means to personal prestige and competence. Recent graduates who have completed an internship in a general hospital and two to five years of postgraduate study in a clinic are the most ardent advocates of group practice. Experience has shown them the value of highly specialized training and the benefit of expert opinion in specialties other than their own. The value of group study among non-organized physicians is not disputed.

Group study by an organized group of physicians will not be condemned when such organization is perfected by men of ability for better service on an ethical basis.

The university hospitals of our medical schools are organized groups for group study. The University of Michigan Hospital has recently inaugurated clinical conferences which are open to the physicians of the state for discussions of cases. It is commendable in small communities that the physicians should quickly follow the examples of their teachers and organize similar diagnostic groups. I do not know what the general experience may be, but my own experience, limited in years altho diversified in territory, leads me to state that county medical societies do not fill the place demanded for group work. Splendid scientific programs are often held, but we may as well be fair with ourselves and admit that as brass tacks they are highly upholstered. The clinical conference is as necessary in group study as the meeting of a board of directors of a corporation; specific cases are discussed and reviewed to the benefit of the patient and the physician. Such conferences must be held in strict confidence and in all sincerity. Only those who have lived in these conferences can appreciate the true value of them. The knowledge of each man is called out to its fullest width, his training and powers of observation laid bare, and his true worth made manifest to himself and to his fellow practitioners. These conferences become schools of instruction where all are teachers and at the same time pupils. The study and diagnosis of disease by specialists is better carried out if these specialists are in organized groups.

The majority of groups that are being organized have the benefit of the patient as the basis. Better diagnosis, quicker service in the office, and better hospital service are secured by closer cooperation. More men are enabled to devote their time to a special service and thereby markedly improve their efficiency. Men who unite in a group usually spend some time attending postgraduate schools to brush up in special work, and more time in visiting other clinics and attending

scientific meetings. The average physician is made better by this postgraduate study and thru the group practice opportunity is offered to many who if they continued in private practice would not spare the time nor money necessary to take it.

In discussing group practice I leave out of consideration the financial adjustment. There is too much to be said on both sides of this issue to go into that here. My personal experience in the formation of a small group and working in a large group convinces me that satisfactory financial arrangements can be made. I will only say that the ideal way to practice can be followed, will be followed, to the financial betterment of some and at a loss to others, but the same spirit of selfdenial that leads able specialists to hold positions with small salaries in our medical schools, denying themselves the luxuries that would come from their incomes in private practice, will lead other men to positions of honor in service in groups of clinical workers.

What is the position of ophthalmology in such groups and what training in ophthalmology is necessary to fit a physician to carry the responsibility of oculist in such a group? Ophthalmology is the oldest and most highly specialized of the divisions of clinical medicine and more likely to be practiced independently of general medicine, yet no phase of the work is really independent. The signs and symptoms of bodily disease that are gathered by examinations of the eyes are too well known to be detailed here. External examination of the eyes, examination of the fundus, and testing of refraction all have a place in the general examination of a patient. Fergus⁸ says "Personally, I would not regard a man as fitted to enter the profession of medicine unless he could use an ophthalmoscope to examine the fundus. It is the use of the ophthalmoscope as an instrument of medical research rather than of ophthalmic investigation that is of importance."

The treatment of most ocular diseases can be carried out better by an internist or specialist in another field than by the oculist. In the present day of special practice no oculist is justified in inde-

pendently treating syphilitic diseases of the eye, tuberculosis of the eye, metastatic infection, endocrin disturbances, neuroretinitis, choked disc, disturbance of the motility of the eye, or even headaches with error of refraction. The ophthalmologist, on the other hand, can be of marked service in treating systemic disturbances. All patients with cardiovascular-renal disease, hypertension, nephritis, diabetes, diseases of the blood and of the blood-forming organs, diseases of the central nervous system, syphilis, tuberculosis, diseases of the skin, and pregnancy should have as part of their routine examinations careful external and ophthalmoscopic examinations by specialists who know the details of the findings of the internist or other examiners.

Batten prophesies⁴ that "further progress in ophthalmology, as far as one can see, will be mainly on medical lines, and will require men with a physician's training and experience." The desirable amount and character of training required to fit a man as ophthalmologist in group practice is stated in a quotation from Fergus: "Lastly the ophthalmic practitioner should know all the symptoms in the organs of vision which indicate systemic diseases or diseases of the brain and nerve system. No man can learn this amount of work unless he has had a training in an eye clinic and in pathologic and physiologic laboratories for at least three years. A man, in my opinion, has no right to be regarded as a specially qualified ophthalmic surgeon unless he has spent three years at clinical ophthalmology and in laboratory work."⁵

Seventeen of the leading ophthalmologists of this country answered an inquiry as to their special preparation in ophthalmology after graduation and before taking up private practice and gave their opinions on the time necessary for special study today. The shortest preparation was three years, the shortest advised one year. The longest preparation was ten years, the longest advised six years. The average preparation was five years, the average advised from three to six years.⁶ It is estimated that there are nearly 4,000 long term graduate students in the

United States this year who wish to prepare themselves by two or more years of study for practice in some special clinical field.⁷ "Most of these men need opportunity to work alone, not in classes, tho under general supervision, for six months to a year in one or more of the fundamental branches. Then they need clinical material and laboratory and library facilities for two or more years of intensive work in diagnosis and treatment. They need personal responsibility for patients, inspiration to investigation, keen criticism and opportunity for fearless discussion with real leaders in their specialty. They need little, if any, formal teaching, of which most of them have already had too much."⁸ The opportunities for such instruction in ophthalmology are woefully lacking, but if the specialty is to keep abreast with other fields in group practice the need is apparent. Dr. Parker at the University of Michigan was, I believe, the first to realize this need and inaugurate a regular three years' postgraduate service in a University. The University of Colorado offered a University degree in Ophthalmology after two years of special study. The University of Minnesota followed by offering a University degree after a three years' service, later offering the degree of Master of Science after two years' service and the degree of Doctor of Philosophy after three years' service. An internship of one year, preferably in a general hospital, however, is required for eligibility to fellowship.

It is immaterial whether a university degree be offered for special work in ophthalmology. That is a question to be decided by other minds and lies outside the scope of this paper. The trend of the times, however, is strongly toward more preparation, longer time spent in clinical work, and more attention given to medical phases of ophthalmology. The student wants patients, not lectures, cases, not books, and opportunity to study cases with the internist and other specialists. Six months to one year may be spent with profit in fundamental sciences, anatomy, physiology, pathology, bacteriology, and physical and physiologic optics, and from two to two and one-half years in clinical work and

research. The University of Minnesota provides nine months in the fundamental branches and twenty-seven months in clinical work. Six to twelve of the twenty-seven months are devoted to work in a subject, as a minor, related to ophthalmology. The fundamental work is given in the University by department heads and capable assistants, the clinical work at the University and at the Mayo Foundation in Rochester. The closest possible relationship is maintained at the Mayo Foundation and Mayo Clinic between the specialties by a connecting link; graduate students with majors in ophthalmology are assigned to sections in medicine, neurology, and so forth, for study in their minor subjects. In addition to this students in other specialties are given twenty-four hours in medical ophthalmology and ophthalmoscopic demonstrations. The object of the latter is better to acquaint the internist and others with the importance of ophthalmology as a diagnostic aid and to encourage the employment of an ophthalmologist in consultation practice. The more familiar the internist becomes with ophthalmology as a diagnostic aid the more will he require of the ophthalmologist. To the general surgeon and particularly the neurologic surgeon the ophthalmologist's

work is invaluable, but must be of high merit.

In conclusion I would emphasize the following points:

1. Group study in medicine is necessary for the employment of the best diagnostic methods.

2. Group practice carries the same advantage to the patient in therapeutics as does group study in diagnosis.

3. Greater preparation is being sought by men who wish to specialize and take up group study and practice.

4. The position of ophthalmology in group study and practice is of the utmost importance.

5. The greatest advances in ophthalmology to be made in the future will be along medical lines.

6. More intensive training in medical ophthalmology is required to fit men for special work in group practice.

7. Graduate courses in ophthalmology covering periods of two or three years should be offered in hospitals and clinics throughout the country, to provide opportunity for students who desire to prepare themselves more efficiently for group study and practice.

8. Closer cooperation between ophthalmology and other specialties should be fostered in hospitals and clinics.

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NOTES, CASES AND INSTRUMENTS

HIGH MYOPIA IN A CHILD.

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This case is reported as it is unique in the writer's experience. None has been found in the literature tho cases similar to this may have been seen and not reported. Several busy confreres have been questioned about their experience in myopic conditions and could recall no parallel case. Even in races predisposed to high myopia the high degrees do not develop in young childhood.

The patient under consideration was first seen in November, 1917, when he was $5\frac{1}{2}$ years old. His mother was distressed because he held objects within three or four inches of the eyes and could see very poorly at distance. She had noticed this ever since he had paid any attention to smaller objects. She reported that one eye had turned in at times when he was younger. He had had no children's diseases except whooping cough at two years. His general health was excellent and he was a rugged, bright youth. Parents both see well without glasses.

EXAMINATION showed vision O.D. 3/60, O.S. 2/60; with correction O.U. 2/6. Exophoria 8 degrees. Eyes externally normal except turning out under cover and both slightly prominent. No conical cornea. The Javal ophthalmometer showed a regular astigmatism with the rule of one diopter in O.D. and one half diopter in O.S. Fundi were normal except a slight stretching on temporal side. Total error O.D.—16; O.S.—18.

TREATMENT. Patient was refracted under complete atropin cycloplegia and the full correction was prescribed in lenticular lenses. The condition was fully described to the mother and the danger of an increase in the condition pointed out. School was prohibited and he was denied the use of children's books with any but the largest pictures and print. Permission was given the mother to teach him the alphabet and printing but only with very large letters, and for short periods.

She was instructed to report back with him every month for examination and direction of management. He accepted the wearing of his glasses very nicely and always demanded them immediately after washing his face and the like. He held objects at the proper distance and got much pleasure out of his improved distance vision. He was seen about once a month at the office during the following five months. During that period there was no increase in the error, no increase of stretching and corrected vision improved to 5/12. During the writer's absence from the city in military service for the fifteen months following this period, the patient was looked after by a confrere and the only change in that period was an increase of one diopter in the prescription for the left eye. Since his return sixteen months ago the child has been seen frequently and the refraction checked up and the frame adjustment carefully looked after. His condition now shows no increase in the error or stretching and a vision each eye 5/9.

It has been very satisfying that there has been no progress in the myopia during the three years he has been under observation and care, especially thru this anatomically formative period. We believe that the intelligent help of the mother has been quite a factor in the result. At what age the condition started or what caused it we cannot say.

PARALYSIS OF ACCOMMODATION.

K. C. WOLD, B.S., M.D.,

ST. PAUL, MINN.

The following case is of interest because of its abrupt termination.

September 29, 1920, Miss M. G., age 23, stenographer, gives history as follows: Discharged from hospital two weeks ago after a seven weeks' stay for diphtheria of moderate severity.

Complaint: Three weeks ago suddenly was unable to read or see anything close to her eyes.

Examination showed partial paralysis of soft palate which she stated had been much worse. Tonsils were infected and small amount of albumin found in urine. Pupils reacted normally to light but not to accommodation. They were equal and of normal size. Refraction showed: R. plus 0.75 s. \odot 0.75 c. ax. 90° = 6/6. L. plus 0.75 s. \odot plus 4.50 c. ax. 60° = 6/12. Fundus showed areas of exudate above and below both discs.

Treatment consisted of the new correction: Ferrous carbonat and strychnin in capsule. Advised tonsillectomy.

October 18th tonsils were removed under ether anesthesia, and on recovery the accommodation had been completely restored. She had attempted to read just previous to operation and was greatly astonished when print became clear on awakening.

This paralysis would have probably cleared up soon without the operation, but to my mind it was hastened thereby. An element of hysteria might have been superimposed on an organic condition.

DERMOID OF ORBIT.

CLIFTON M. MILLER, M.D.,
RICHMOND, VA.

A. B. Female. Age 9 years. Seen Sept. 1st, 1904. No deformities or dermoids in other members of family. Father and mother living, in good health. Born July 5th, 1895. Healthy normal baby. No deformities of any kind.

A few weeks after birth the parents stated they noticed a growth of some kind under the left eyelid. A short time later a hair or two projected under the lid and these continued to grow in length and increase in number until there were six or seven long black hairs growing from under the lid. These hairs grew rapidly and were frequently cut to prevent their hanging too far down on the face but were always left sufficiently long for the cut ends to project beyond the lids.

Examination shows a healthy; well developed girl, with no deformity except about the left eye. Left upper lid is permanently drooped and seven or eight

coarse black hairs project from beneath it. Tumor is in left orbit on temporal side. On looking down with very slight elevation of lid an ovoid pinkish mass, elastic to the touch is seen beneath the temporal portion of the upper lid, from the most prominent portion of which the hairs were springing. The covering epithelium was fairly adherent to the underlying portion of the tumor. Pressure was painless. The eye was pushed somewhat downward and inward by the mass. Under a general anesthetic, the tumor was removed without difficulty. No bands of adhesion to frontal bone could be demonstrated.

Tumor 26 x 18 x 8 mm., central cavity containing yellowish fluid. A small bony mass the shape and size of the crown of a canine deciduous tooth was found in the tumor. Diagnosis: lipodermoid of the transition fold, containing hairs and a deciduous tooth. This case has been examined in the past few weeks. There is no appearance of any return of the growth. The eye is normal, in movement and appearance, nor is there any physical weakness except a condition somewhat resembling angioma of the left vocal cord.

TRAINING OF THE HANDS.

CALVIN C. RUSH, M.D.,
JOHNSTOWN, PA.

The Japanese wrestler, whether the champion of the empire or a stoker in a trans-Pacific steamer, does not undertake a match without first stamping the ground with all his might to limber up the hip joints; the American baseball pitcher is not permitted to enter even a minor game without first "warming up" by practice; but some ophthalmologists perform delicate operations of the greatest consequence to their patients without any preliminary training of the hands.

Many operators have found that heredity or manual labor has given them rather thick "farmer's hands," better suited to gross than to fine movements. The exercises which the writer used to acquire a more delicate control of his fingers form the basis of the suggestions contained in this paper.

The first and greatest requirement for a steady and manageable hand is a feeling of self confidence or self mastery. An operator can hardly hope to have a steady hand in the operating room if he does not have a control of himself elsewhere. To acquire this control he should form the habit of making his movements—especially those of his hands—deliberate and steady movements. The knowledge that one is steady in his movements is of great psychologic importance when a delicate operation is undertaken.

To further bolster up his self confidence the operator should acquire a greater deftness in the use of his hands. A good practice, as suggested to me by Dr. Howard of Peking, is that of doing the common or usual things in an unusual way—e. g. one may reverse the use of his hands in eating, in brushing the teeth, in combing the hair, etc. Such exercises will give one greater facility of movement with both hands. As another simple exercise one may reverse his hands in shaving. No man who is afraid to risk his own skin with a razor in his left hand should presume to risk his patient's eye with a Graefe knife in his left hand.

In using a pen the operator will do well to practice neatness, regularity and fineness of penmanship, instead of the abandon which so many physicians affect.

In preparing the hand for more delicate movements certain exercises to lessen the stiffness of thumb and fingers are helpful:

1. With force press the thumb toward the little finger, i. e. press the thenar against the hypothenar eminences.
2. Forcibly flex each finger and at the same time press the finger backward.
3. Extend all the fingers to the limit by pressing the corresponding fingers of each hand together.
4. Practice the child's game of crossing the second finger over the first and vice versa.

These simple exercises are sufficient to greatly aid in the mastery of the hands.

To prevent the hands from becoming stiff it is advised that gloves be worn when the hands are used for strenuous play or work. To acquire familiarity with the movements required, the beginner cannot be advised too strongly to operate repeatedly upon the eyes of animals. These can usually be obtained from the butcher.

The operator cannot disregard his personal habits if he is to succeed. Excesses of tobacco or coffee should be avoided. That which is an excess for one may not be an excess for another. I know an eminent operator who cannot smoke cigarettes on the morning of his operating day without a tremulous hand, while a well known surgeon of India is said to operate while smoking.

Regular hours of sleep are most important and should be seldom broken. It goes without saying, that all these rules will be of little avail when accompanied by excessive venery.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

BELGIAN OPHTHALMOLOGICAL SOCIETY.

April 25, 1920.

Phacoerisis.

I. BARRAQUER, Barcelona, Spain, described his operation of phacoerisis and demonstrated the instruments employed for it. The results obtained are said to be most brilliant.

Peripapillary Hemorrhage in a Myope.

MARBAIX, of Tournais, reported a case of such hemorrhage occurring in a woman who suffered from high myopia. The report was illustrated with drawings by the patient, showing the subjective changes during resorption of the hemorrhage.

Rodent Ulcer with Perforation of Both Corneas.

H. COPPEZ, Brussels, presented a case in which the ulcers had repeatedly perforated the cornea and produced prolapse of the iris and in the last perforation of one eye the formation of cataract. On the right side the progress of the ulcer continued until it invaded the whole cornea except a small central portion. In the left eye the ulcer is stationary for the last two years.

Eyes of Masques and Statues of Ancient Egypt.

COULOMB, Paris, presented a series of 23 such eyes from old Egyptian statues and masques.

Frontal Mucocele. Temporary Intranasal Drainage.

MORAX, Paris, in a case of frontal mucocele, under local anesthesia, made a cutaneous incision at the level of the eyebrow. The periosteum was turned back and the mucocele incised. The wall of the frontal sinus being opened for the purpose to an extent of 6 mm. thru the opening made by trephining, he introduced a small perforated silver drain, terminating at its upper end in a thread of silver. The lips of the wound were sutured together with this

thread passing between them. This drain was drawn out by the silver thread on the 6th day. The mucocele has not recurred and the esthetic result is perfect.

Flexible Goggles.

BONNEFON, Bordeaux, described the making and application of simple protective goggles. A disk of card board was bent in the form of a cone, furnished with two ears exactly opposite each other to which were attached tapes forming a coquille in close contact with the skin thruout its circumference. It could be used for the simple protection or for compressive occlusion of the eye.

Artificial Tarsal Cartilage.

KLEEFELD, Brussels, to combat the deviation of the cilia produced in trachoma after extirpation of the tarsal cartilage, has reconstructed a solid frame work for the lid in this way: Silk threads are boiled in 4% sublimate solution and introduced into the tissues. These threads are not absorbed, and cause in the tissues a lively reaction. As a consequence there appears new formed sclerosed tissue which is very resistant.

Choroiditis and Tenonitis.

TERLINCK, Brussels, reported a case of simultaneous metastatic choroiditis and tenonitis due to a metastatic pneumococcus infection.

Atypical Vernal Conjunctivitis.

GALLEMAERTS, Brussels, reported on this case.

In a boy aged 12 years, the corneas presented at their periphery a border several mm. wide, deeply vascularized, and resembling an enormous arcus senilis. Each year in the month of April the boy suffered from ocular itching and the conjunctival culdesac presented in slight degree the milky aspect characteristic of vernal conjunctivitis.

Fixation of Eyeball in Operation for Cataract.

H. COPPEZ, Brussels, recommends in the operation of cataract a double fixation. A blepharostat is omitted and fixation forceps held by the operator are applied to the insertion of the superior rectus muscle thruout the whole of the operation. An assistant steadies the eyeball by fixation forceps applied at the insertion of the tendon of the internal rectus muscle during the making of the puncture and counter puncture and the first part of the corneal incision. After the expulsion of the lens nucleus the fixation of the superior rectus enables the operator to force out the cortical masses remaining in the upper part of the lens capsule by accurate systematic pressure.

Meningoencephalocele of Orbit.

D. VAN DUYSE, Gand, pointed out there exists a great similarity between meningoencephalocele and intraorbital colobomatous cysts. They are similar in histologic structure and perhaps have a similar primary origin. In the case he observed there had been a meningoencephalocele of which the cerebral wall was composed of layers that resemble the structure of the cerebellum. The removal of the tumor was followed by death.

High Blood Pressure and Retinal Hemorrhages.

DEWAELE, Gand, has measured the blood pressure in a series of cases of hemorrhagic retinitis. In general there was an increase in the blood pressure. This vascular hypertension is an important factor, but not an exclusive etiologic factor of retinal hemorrhage. The composition of the blood takes an equal part in the etiology and notably the conditions of uremia and cholesterolinemia.

Internal Treatment of Glaucomatous Hypertension.

WEEKERS, Liege, basing his treatment on the controlling action of calcium chlorid upon processes of transudation and exudation administered this salt by the mouth or by intramuscular or intravenous injection to 21

patients attacked by glaucoma. By regular tonometric measurements he ascertained the consequent effect of the remedy on the ocular tension. In many cases such medication produced no effect on the tension. In other cases the calcium chlorid seemed to influence favorably the intraocular pressure. In acute glaucoma the various treatments employed had not made it possible to draw clear conclusions.

Extraction of Cataract in Its Capsule.

H. Coppez, Brussels, exhibited with a cinematograph films showing Smith's operation. Four operations were thus shown, the films being furnished by the Doctors Green, of San Francisco.

Milk Injections to Prevent Postoperative Infection.

Van Lint, Brussels, at the time of operation had employed injections of sterilized milk to prevent complications due to infection. 5 ccm. were given at a dose immediately preceding operation. The reaction of the eyeball following operation with such injections is much less marked and the results obtained were very favorable.

Sterile Collyria.

Marbaix, Tournais, urged that one must provide for his patients collyria that were sterile. To avoid that such collyria should become contaminated and furnished to patients, Marbaix recommends a flask with a peculiar tubular spout thru which the fluid is expelled by expansion of the air with the warmth of the hand.

New Stain for Corneal Ulcers.

Kleefeld, Brussels, found with the corneal microscope and Gullstrand lamp that the staining of superficial lesions of the cornea by fluorescein consisted of groups of diffused greenish spots without distinct staining. The Bengal rose mixture, Victoria yellow and azoflavin give a true, vital staining to the tissues. The sound epithelium is not colored. When there is a break in the epithelium an intense rose color is caused by juxtaposition of minute points of red.

MARCEL DANIS.

COLORADO OPHTHALMOLOGICAL SOCIETY.

October 23, 1920.

DR. J. A. PATTERSON, presiding.

Cryptophthalmos.

A. C. MAGRUDER, Colorado Springs, presented two cases of cryptophthalmos, in a boy aged eight years and his sister aged eleven years. The mother suffered from the same condition. In each case the eyelids were externally of normal appearance, except that there were supernumerary eyebrows across the upper lids. No movement of the eyeballs could be demonstrated. The boy could locate the position of a light held before either eye, the girl only before the left eye. There was no separation of the eyelids from the eyeballs.

DISCUSSION. E. M. Marbourg had attempted operation on the mother some years previously and had found dense adhesion of the eyelid to opaque corneal tissue.

W. H. Crisp, Denver, referred to the fact that the tissues of the eyeball proper, including the vitreous, were not unlikely to show other congenital defects beside those present in the tissues of the lids and cornea.

Melville Black, Denver, thought that there was nothing to be lost by dissecting down and attempting to find whether any space existed between the eyelid and eyeball.

Refractive Peculiarity in Lens.

A. C. MAGRUDER, Colorado Springs, presented a young man whose right eye showed a peculiar refractive condition in the crystalline lens, seen on ophthalmoscopic examination as a darker area in the lower part of the pupil, or sometimes in other directions, varying with the position of the examiner. Along the upper edge of this dark area ran a red line which looked like a bloodvessel, but which was produced by condensation of the transmitted color of the background of the eye. The vision of either eye was 20/40 without glasses, and 20/20 with glasses, R. -1.50 cylinder on +0.25 sphere, L. -1.00 cylinder on +0.25 sphere.

DISCUSSION. Melville Black, Denver, thought that the disturbance was really in the cornea, and represented a beginning keratoconus. He would advise close observation of the patient every six months. If at the expiration of eighteen months there had been no change in the refraction, the case could be dismissed, while if there was a progressive refractive error the endocrin condition should be gone into carefully.

J. M. Shields stated that if the light was thrown on the right eye from the left side there was a round haze well forward but central, about as would be seen in beginning cataract.

W. H. Crisp, Denver, felt that the disturbance was not in the cornea but definitely in the lens, since the corneal reflection of a Placido disk was undisturbed in different parts of the cornea. He suggested that the lens condition might consist of a sort of globule or lens within a lens, of different refractive conditions from the remainder of the crystalline lens. The regularity of the cornea was further evidenced by the very normal improvement of vision produced with the cylindrical correction.

Ocular Injury Followed by Glaucoma.

A. C. MAGRUDER, Colorado Springs, presented a man aged twenty-three years whose left eye had on March 29, 1920, received a lacerated wound of the cornea from the head of a rivet. The iris was caught in the wound. A secondary intraocular hemorrhage occurred on April 4, and in spite of the repeated use of eserin the eye went on to an advanced state of glaucoma. The vision fell from 30/40 with correction on May 27 to fingers at one foot on October 3. (Iridectomy was later done on account of a severe exacerbation, and was followed by relief from pain.)

DISCUSSION. Melville Black, Denver. The patient has a foul mouth, with a number of suspicious teeth. He probably has a focal infection uveitis. At the present time an iridectomy is indicated and the mouth should be looked after. As soon as iridectomy has been performed I would put him on atropin.

W. C. Bane, Denver, referred to a case in which he had done double bilateral iridectomy for glaucoma a year ago. The patient had retained what vision she had, but continued to have pain in the eyes as well as headache. Within the last two weeks a left upper molar tooth had been found to have two roots exostosed, and the symptoms disappeared after removal of that tooth. The tonsils had also been removed since that time.

W. H. Crisp, Denver, suggested that we should think of the teeth in traumatic cases that did not clear up promptly. He referred to a case of cataract in which the discharging stump of an eye lost after previous operation had quieted down, and the second eye had done well after extraction, following removal of a number of badly diseased teeth and roots; and also to a case of blasting injury seen with Dr. Libby in which persistent irritation quieted down after attention to some diseased teeth.

H. M. Thompson, Pueblo, referred to two cases which he had seen in which failure of traumatic disturbance to clear up was due to bad teeth.

Pigmented Mole or Melanosarcoma.

E. M. MARBOURG, Colorado Springs, presented a girl of fourteen years who gave a history of a slight blow on the orbital margin of the left eye eighteen months previously, with subsequent development of a dark speck at the nasal corneoscleral margin. The growth, which seemed to have gradually enlarged, was now about 3 mm. by 2 mm. in diameter, and was very heavily pigmented, being almost black in color. A month ago the area was recorded as triangular, but the angles were now becoming rounded. The eyeball was otherwise absolutely normal.

DISCUSSION. Melville Black, Denver. The case is one for observation. There is no justification for operation unless you are certain that the growth is a melanosarcoma.

W. H. Crisp, Denver, suggested that very careful measurements of the growth should be made and recorded every time the patient came in. He further considered it absolutely necessary either to leave the eye entirely

alone or to remove the whole eyeball; since in this type of case the risk of metastasis occurring with great rapidity after meddling with the growth was very pronounced.

C. E. Walker, Denver, would remove part of the growth, and if it were found to be sarcoma would try the effect of large doses of the x-ray, and later operation.

E. R. Neeper, Colorado Springs, recalled a case shown by Dr. Edward Jackson some years ago and later reported as positively melanosarcoma; the patient having died of metastases within the next six months.

Magnet Extraction of Steel.

E. M. MARBOURG, Colorado Springs, presented a man from whose right eye a piece of steel 6 mm. long by 2.5 mm. wide and 0.5 mm. thick at the narrow end had been removed by Dr. Neeper thru the wound of entrance with the giant magnet. The piece of steel had entered thru the cornea to the nasal side of the pupil, and had lodged behind the iris at about its junction with the ciliary body. When the patient was seen twenty-five minutes after the accident, the lens was already cloudy.

DISCUSSION. W. C. Bane, Denver, believed that the eye would eventually have to be removed and possibly soon. The injury had probably involved the ciliary body. The patient had not yet got beyond the stage at which the other eye might become involved.

C. E. Walker, Denver. It is not quite certain that the ciliary body was injured, as the fragments may have dropped to the ciliary region. The main trouble is that the iris is in the corneal wound. It would be advisable to extract the lens and free the incarcerated iris.

E. R. Neeper, Colorado Springs, felt that in a similar case he would not again extract at the point of entrance, but rather thru an operative wound directly over the foreign body. It is hard to use the giant magnet in such a case without lacerating the tissues.

Unusual Deposits in Iridocyclitis.

F. E. WALLACE, Pueblo, presented a boy aged sixteen years, who since July 1 had had an inflammation of the right eye, which had gradually become more

severe. The left eye had been involved in the same way but more mildly, beginning about August 1. The symptoms were generally those of a gradually increasing iridocyclitis. The history was negative as regards the nose, throat and teeth, and a Wassermann test was negative. The right cornea was generally cloudy, the pupil contracted, the iris muddy, and the fundus invisible. On the posterior surface of Descemet's membrane was a geometric group of thirteen white spots each of which was probably about a half mm. in diameter. The apex of the fairly regular triangle in which these spots were arranged pointed downward. There was no hypopyon, altho in the lower outer angle of the anterior chamber there was a rather large accumulation of exudate. There were also several large deposits of a like character on the iris. The left eye presented a similar but less marked condition. The vision of the right eye was now limited to hand movements. The right pupil had dilated under atropin a month previously but did not at the present time.

DISCUSSION. C. E. Walker, Denver. The cause of infection may be tuberculosis. Leeches, hot applications, and dionin should be tried in addition to the atropin.

J. M. Shields, Denver, suggested an oily solution of atropin.

Melville Black, Denver, thought that the case lay between uveal tuberculosis and gonorrhea.

W. H. Crisp, Denver, suggested that the patient should be given a strong solution of atropin to use at home, on account of the great amount of dilution from the abundant lachrymation.

J. A. Patterson, Colorado Springs. Altho the case is very suspicious of tuberculosis, the possibility of syphilis should not be dismissed.

Tuberculosis at the Macula.

H. M. THOMPSON, Pueblo, presented a case of exudative chorioretinitis affecting the macular area, and measuring about four-fifths of a disc diameter horizontally and three-fifths vertically. The diseased area was elevated several

diopters, and was irregularly pigmented. There were three small vessels extending from below upward a little more than a half the vertical diameter of the lesion. Below and to the nasal side the retina was "fluffy." To the temporal side of the macular region there were several minute white spots, interspersed with small hemorrhages. In the upper part of the fundus patches of yellowish exudate with the old hemorrhage were visible. The retinal vessels seemed to be raised somewhat as they passed over this region. The retina in the vicinity of the main lesion seemed slightly edematous. The visual acuity of the right eye was fingers at three feet, left eye 20/15. The peripheral field of the right eye was not so good as that of the left. Failure of vision in the right eye had first been noticed February, 1920. The family history was negative, and four sisters and four brothers showed no signs of tuberculosis. From November, 1915, to January, 1918, the patient had been under treatment for active lung tuberculosis with a streptococcic secondary infection. In January, 1918, there was apparent arrest of the lung disturbance, and the weight had increased about forty pounds. In September, 1919, there was an acute exacerbation with gastrointestinal symptoms and some nephritis and the weight fell off twenty-five pounds. The tonsils were removed in June, 1920. Dr. Thompson exhibited a skiagraph of the chest showing involvement of both lungs.

DISCUSSION. Melville Black, Denver, remarked that there was some pallor of the temporal side of the optic disc of the right eye.

Dislocated Lens.

J. A. PATTERSON, Colorado Springs, presented a woman aged fifty-eight years whose right eye had about April 16, 1917, been struck with a piece of kindling wood which she was chopping. The eye gave no external indication of injury at that time, but the eyeground was seen thru a haze which seemed to be more marked on the temporal side. Eight days after the injury the tonometer registered 23 mm. The

outer half of the pupil failed to dilate under atropin, the temporal half of the iris seemed tremulous, and the media continued to be hazy. She complained of flashes of severe pain during which the vision was lost for periods of one half hour at a time. The vision of the right eye was 6/25, of the left eye 6/12; improved with correction to right 6/12 partly and left 6/5 slowly. The next tonometer reading, shortly after this, was 59 to 60 mm., but by February 15, 1918, under pilocarpin and eserin, this had declined to 32 mm. The patient was under the care of Dr. Crisp for some time while living in Denver. She refused operation from both Dr. Patterson and Dr. Crisp. She was not seen again until August, 1920, at which time the vision of the right eye had fallen to faint perception of light and shadow, projection being uncertain. With the ophthalmoscope only a red reflex could be made out, while by oblique illumination the iris was very tremulous and the lens capsule could be seen floating in the vitreous. Would it have been practicable to remove this dislocated lens with the scoop?

DISCUSSION. E. R. Neeper, Colorado Springs, had had a case of partial dislocation of the lens in a teacher some years ago, and had been able to remove the lens.

Senile Cataract with Congenital Coloboma of the Iris.

H. M. THOMPSON, Pueblo, reported a case of bilateral senile cataract in combination with a typical congenital coloboma of each iris. The patient was a married woman of forty-eight years. There was no history of congenital anomalies in the family. There had been four brothers and two sisters. The mother of the patient had been subject to miscarriages. The patient was a twin, and was said to have weighed two pounds at birth: the other twin was normal. The patient had married at thirty years, and had had three stillborn children and one child a boy nine years old and in good health. Wassermann test and urinalysis were negative. The vision of the right eye was 20/200, of the left eye

fingers at three feet. There was nystagmus of the right eye, and a left microphthalmus with internal strabismus. The right lens showed stellate opacity, the left lens was completely opaque. Dr. Thompson proposed to remove the lens thru an incision directed downward, bringing a conjunctival flap over the wound; and operating first on the squinting and probably amblyopic eye, in order to accustom the patient to the procedure.

W.M. H. CRISP,
Secretary.

SECTION ON OPHTHALMOLOGY, AMERICAN MEDICAL ASSOCIATION.

Report of the American Board of Ophthalmic Examinations.

Since the last meeting of this Section, examinations have been held in New York City, October 21 and 22, 1919, and in New Orleans, April 26 and 27, 1920. The certificate of the Board has now been awarded to more than 150 ophthalmologists, and about as many more applications for it are now pending. There still remain some American ophthalmologists who have not yet made application for it whose public records in ophthalmology would entitle them to the certificate without their being required to present case reports or to pass other examinations. Failing to make such application the opportunity will be withdrawn at the end of this year, 1920.

In the beginning such applications from men of established reputation and standing have been of distinct assistance in fixing attention on the work of the Board, and in helping to make popular this movement of raising the standard of educational requirement for those who would offer their services to the public as especially fitted for ophthalmic practice. But the time in which they could help in this way has now largely passed. Opportunity has been given to all who wish to avail themselves of it. We can now fairly suppose that those who have not applied do not care to do so, and after the close of 1920 all applicants will be required to submit case reports.

CASE REPORTS.

These submitted case reports are coming to occupy a large place in forming a judgment as to proper preparation for ophthalmic practice. It seems proper here to direct attention to what these reports should include in order to make them acceptable for their purpose.

Every report should indicate the age and sex of the patient with such other data as would serve to fully identify him or her. It should give the patient's visual acuity with a note as to whether taken with or without correcting lenses; and the date of taking it. And these records of visual acuity should be repeated as often as is necessary to throw light on the progress of the case.

In all cases the results of ophthalmoscopic examination should be indicated briefly. In refraction and muscle cases, the near point of accommodation should be included. And, in general, all points that throw light either positive or negative, on the chief condition present, or on conditions likely to be associated or confused with it, should be noticed adequately. Ocular lesions dependent on general conditions should be supported by evidence of such conditions, and an exact statement thereof included with the report. All irrelevant, particularly negative statements, should be omitted.

When a case is reported as illustrating an operation, the reason for operating, every detail of the preparation for operation, each stage of progress to recovery, and the final result obtained should be included. The Board does not care to know that a certain person had a cataract removed and saw afterwards. It wants to know how the applicant reached the conclusion that cataract extraction was needed, what form of operation was chosen, how the applicant did it, how closely he watched the patient afterward, and exactly the final result.

Each case reported should have the data regarding it arranged according to some simple rational system, showing successively its previous history (family and personal), the conditions

observed when the case was first seen, its subsequent course, the measures adopted for its relief, and the result. The writer's diagnosis should be clearly and fully stated.

The past five years have shown great improvement in the character of the case reports submitted to the Board. This is traceable in many cases to training in military service, or to the models of the American College of Surgeons. But reports are still received that are extremely deficient. As these reports are more and more important in deciding the adequacy of training for ophthalmic service it is deemed worth while thus to direct attention to the standards that should be aimed at in their preparation.

HIRAM WOODS,

WALTER R. PARKER,

EDWARD JACKSON,

Representing the Section.

Dr. William H. Wilder, the secretary of the Board, has added: It might be well to state in connection with this report that candidates are divided into three classes. Class 1, including those candidates who have practiced the specialty of ophthalmology ten years or more; we ask them to submit ten case reports. Class 2, those who have practiced for a period of more than five years and less than ten years, who must present twenty-five case reports; and Class 3, those who have practiced less than five years, who must present twenty-five case reports. The impression may have been made that the submission of these case reports is all sufficient, but that is not true. The Board is to decide whether or not these case reports are sufficient, and if it deems them insufficient it will require that the individual subject himself to further examination. One point should be emphasized, because from the character of the case reports that have been presented I think some of the candidates do not take this matter seriously enough. They have not devoted enough time and care to the preparation of such a record. The board has to rely on that and it must have a much more complete report, than those submitted with the candidate's credentials.

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JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

CANCER INVOLVING THE EYE.

The movement for the control of cancer, largely one of education of the medical profession and the laity, will also have an influence on our scientific conception of cancer. It makes no discrimination between the various forms of malignant new growth, but places its emphasis on malignancy. It uses the word cancer in its old significance, its still common popular sense, to include every tumor or ulcer that tends to indefinite extension and to ultimate cachexia and death.

For about sixty years, since Virchow published his views of cellular pathology and the classification of tumors, the study of malignant new growths has run chiefly to the study of their cell morphology and the identification of their cell ancestry. This has been followed by an attempt to restrict the term cancer, to make it synonymous with carcinoma, a name to designate only tumors of epiblastic origin.

The classification by cell ancestry has been very useful. It has helped in the natural grouping of tumors; and

the working out of their usual clinical course and the special tendencies of each variety. Mesoblastic tumors have been separated from epiblastic tumors, and epitheliomas from carcinomas. Under the name endothelioma, a group of cases has been transferred from epiblastic to mesoblastic growths. Looking like carcinomas, they are found to belong with sarcomas. Basal-cell carcinoma is distinguished from squamous, cylindrical, columnar or gland-cell carcinoma; and the divisions of sarcomas are even more numerous.

All such refinements of classification and diagnosis have helped toward exact prognosis in any given case, and ultimately help to refinement and exactness in treatment. But, for the time, they have tended to overshadow the general character and importance of malignancy; which is essentially the same in sarcomas as in carcinomas; and demands that for practical purposes we shall take the same attitude toward every variety of growth of either class.

The cancer cell in the body corresponds to the criminal or lunatic in the

community. It is no more important to trace its ancestry thru the epiblast or the mesoblast, than to ascertain whether the criminal is negro, Chinese, or the degenerate offshoot of one of our first families. The criminal has lost the character and relations that would make him useful and has become a menace to the community, so that he must be removed from it. So the cancer cell has lost the characteristics of gland cell or endothelium, has reverted to the tendencies of some very low and primitive form, throwing off the restraints of all higher organization; and must therefore be removed from the cell community. It is not most important that a man is white or black or yellow if he is criminal; not most important that a cell is epiblastic or mesoblastic if it is essentially malignant.

Malignancy seems gradually to develop in cells that have gotten out of the line of functional usefulness—the gland cells of the breast, the papilloma of the lids or corneal limbus, or the long present melanoma; or perhaps even the chronic chalazion. The practical attitude is to regard every such cell-mass as a possible breeding place for cancer, and remove it before any cells with a distinctly malignant tendency have developed within it.

The malignancy of tumors is of all grades, and tends to increase as the cancer develops. A child had glioma of the retina, recognized when a year old. When two and a half years old the pupil was dilated, but the tension normal. Six months later the whole eyeball was packed with the tumor mass and of stony hardness; and it was enucleated. In six weeks there was recurrence in the orbit as large as a cherry, which in a month became as large as an orange. The orbit was eviscerated, but the child died six weeks later. The history of slow development over a long period, followed by rapid increase in the rate of growth, is as striking in regard to sarcomas, and it is the rule in carcinoma.

The danger of all "benign" tumors is that they may become "malignant."

A case of this kind is the one reported by Coover (A.J.O. v.3, 1920, p. 638). The tumor removed in 1903 was examined histologically and found to be a papilloma. After its removal it did not recur until 1913; then it grew very rapidly. Then in 1914 it was removed, with the eyeball and all suspected tissue in the orbit. This time it was found to be an epithelioma.

In all these cases the papilloma usually benign, has given place to cancer of the basal-cell type. This fact is interesting and may contribute to accurate prognosis for such growths. But the important fact is that in a papilloma, some cell groups are likely to develop the tendency to malignancy—*indefinite multiplication without regard to the needs of function or the organs with which they are in relation*—and the surgeon's duty is to remove them as quickly and completely as possible.

Whether removal must always be by the knife or by chemical caustics may now be questioned. The second paper in this issue brings additional evidence of the possibility of removal—destruction of all cancer cells—by radium; with a remarkable reduction of scarring. The definite statements it makes regarding dosage and method of application add greatly to its value, and must encourage the wider trial of radium.

This remedy is now becoming more widely available thru the radium "emanation," which can be sent over long distance and used on many cases before it loses its efficiency; and at relatively low cost, since the original stock of radium remains to furnish the emanation continuously, without appreciable deterioration over long periods. That radium can destroy cancer cells, apparently without damage to normal tissues, seems demonstrated. That it can thus remove a malignant growth with the minimum of scarring and displacement of tissues also seems certain.

Whether this method of removal by cell disintegration and absorption is the best for large masses of cancer cells remains to be seen. But after re-

moval of the great bulk of a growth by the knife, it may well be that the use of radium can destroy any remaining cells that have advanced far enough in the direction of malignancy to become starting points for recurrence. To destroy such isolated groups will probably require the same dosage as has been found effective for removing cancer masses.

It seems now fairly well established that normal tissues about the eye are but little affected by radium in general. The highly specialized tissues, suited to the performance of the body functions, are less influenced by it than those that have deviated from the normal type in the direction of malignancy. In this sense radium and the X-rays have a distinctly selective action. Prudence will dictate great care to keep away from the danger line as far as possible. The accidents of the early years of radiology must not be repeated. But, except for those very frequently or continuously exposed to the influence of such radiations, the danger of damage to normal tissue seems slight, from any intelligent application of radium, with the care that it is now understood to require.

Cancer has stood for thousands of years as a type of malignant fate. But it seems now that by removal of cells that are developing, or seem liable to develop malignancy, it is being brought under control. About the eye such cell masses are likely to be noticed early and while comparatively small. There prompt treatment should practically eliminate the danger of cancer in this region. Even glioma, in which the tendency to malignancy appears at a very early age, and is extremely strong, may yield to early treatment, altho this is not yet fully demonstrated.

E. J.

EXAMINATIONS INTO QUALIFICATIONS FOR SPECIAL PRACTICE.

These are capable of doing great good: By stimulating those who desire to specialize in practice to a more systematic, broad and thoro study of

their specialty. By inducing schools for graduate instruction to provide more carefully chosen, better arranged and complete courses, than they have done heretofore. By causing chiefs of clinics and teaching specialists to give more instructions and helpful supervision to the work of their assistants. By furnishing a guide by which the profession and the public may choose more intelligently the specialists to whom they confide the treatment of their patients or themselves.

The extent to which these benefits may be secured by special examinations, as those in ophthalmology, depends on the confidence that their colleagues in the specialty, the general medical profession and the public feel in the justness and discrimination of the decisions of those who conduct such examinations. This confidence must in the end rest on the intelligence, sense of responsibility, fair mindedness and sympathy of the examiners; as shown in the work of the board—the candidates they certify or do not certify, as these come to be known to the medical profession and the public.

The passing upon the character and attainments of applicants for a certificate of fitness for special practice demands, with devotion to the purpose of such examination and balance of character, the assistance of colleagues. Those who would profit most by getting such a certificate, will seek it most eagerly, and if they do not deserve it, will try to conceal their deficiencies and make improper considerations count in their favor. Some who should be certificated will hesitate to submit their claims to judges whom they do not know, or in whose fairness they lack confidence.

As is pointed out in the communication published under Correspondence (p. 61), it is with men already established in special practice that such examiners find it most difficult to deal with complete fairness. No matter how honestly he may intend to be strictly just, the examiner cannot escape from his personal character and predilections. The good natured man, who

would like to see everybody pleased, is liable to grant the certificate where there is great doubt of its being deserved. The man with a strong confidence in his own uprightness, and lacking sympathy for others is likely to do injustice in the opposite direction. Both are in danger of being swayed by prejudice, prejudgment; impressions already fixed with regard to colleagues or rivals in practice, before the task of deciding on professional fitness was undertaken, or the facts on which such decision should be based were fairly and fully placed before them.

It is not likely that the men chosen by the profession for examiners will be consciously influenced by personal feeling. But it is very difficult for most minds to place themselves in the completely judicial attitude, by changing the usual currents of their thought of persons and actions; about which they have already taken a certain attitude, on evidence not so complete or so carefully sifted as it should be for the basis of a judicial decision. There is reason to fear that prejudgment may be the controlling factor in decisions regarding men whose imperfections and mistakes have long been known.

Then there is danger that the granting of a certificate may be due to considerations other than those the examiners were chosen to pass upon. The Board for Ophthalmic Examinations is created to pass on knowledge and skill for ophthalmic practice, and ethical fitness for the office of professional adviser. Narrowness or breadth of education outside of this, a quarrelsome disposition, or an agreeable plausible manner, some public service, or an exhibition of meanness not connected with the professional relation, should not determine the granting or withholding of a certificate; or the certificate will lose its special significance. Fear of giving offense, and a desire to mete out punishment, must be equally excluded from any influence in reaching a decision.

The Board for Ophthalmic Examinations, or the Examiners of the American College of Surgeons, or the

newly appointed Examiners in Otolaryngology, or other boards that will be appointed to examine into fitness for special practice, have a difficult situation to meet. They need and should have the assistance of the profession they serve. Accurate information regarding candidates; unmixed with personal prejudice, and unobscured or magnified by inuendoes and general impressions, should be at their command, even regarding those candidates of whom they have no personal knowledge. Patience must be exercised in regard to the long time sometimes required to get at the significant facts, and reach a just estimate of their accuracy and importance. Most of all, they should have charitable consideration of their mistakes or prejudices, for they will make mistakes, and be swayed by prejudices; as are all other human beings.

In turn it will be the duty of these examiners to help elevate the standard of the profession, by making individual members of it better. By recognizing defects in education among the older men who grew up under a most defective educational system, or absence of system; encouraging them to get added training they need, and promptly recognizing the newly acquired fitness. By recognizing that old mistakes are honestly regretted and repented of; and by reducing to a minimum the effect of their personal prejudices and tastes; and exercising that charity for earlier errors of those who promise better things, that their own defects of judgment must ask of the profession they serve.

E. J.

JOURNAL CHANGES.

With the beginning of our fourth volume the list of recently published articles, heretofore printed under the heading "Ophthalmic Literature" is transferred to the journal of that name. This will leave more space each month, which we hope to occupy with a larger number of abstracts, than it has been possible to find room for in the last year or two. The abstract department, it will be noticed, is transferred to near the end of each number.

The Ophthalmic Literature lists will now be published quarterly. This has the advantage of having all the articles on a single topic, that appear during the year, grouped in four lists, instead of in twelve, which must all be searched to find the year's literature of the subject, when a part of the list was published every month.

Any possible disadvantage in this arrangement is met by the offer that any subscriber, who desires to bring his bibliography up to date on any subject he is studying or preparing to write upon, can get the desired references up to the last paper published, by writing for them to the Editorial Office of this JOURNAL.

The two publications are still offered for the old price, and it is hoped that the efforts of our old subscribers will add enough new ones to our lists this year to make any increase of price unnecessary. With the day of issue brought to the beginning of the month, it is seasonable to wish all our readers a prosperous, progressive, Happy New Year.

MISSING NUMBERS.

Subscribers, who on examination of their files find some number of volume 3 missing, are requested to apply for duplicates at once. These can be supplied without charge for most of the issues; altho, we regret to say, that for two of the numbers the supply is already exhausted.

BOOK NOTICES.

Manual of Ophthalmic Practice. F. P. Maynard, M.B., D.P.H., F.R.C.S., I.M.S., (Retired), 338 pages, 12 colored plates and 133 illustrations. Calcutta and Simla, Thacker Spink and Co., Edinburgh, E. and S. Livingstone.

It is somewhat startling to western ophthalmologists to have the latest textbook on ophthalmology, and one of the best printed and best illustrated, come to us from India. But when we think of trephining for glaucoma, the Smith-Indian operation for cataract, the excellent reports that have come

from Madras and Calcutta, and the unbounded opportunities for clinical observation there; we begin to realize that out of the Far East we may well expect much of importance in ophthalmology.

This book is based on lectures delivered by Col. Maynard at the Medical College of Calcutta, and is intended for senior students and junior practitioners. We know of none better suited to the needs of such readers. In the crowded curriculum of the undergraduate medical school, the insufficient time given to ophthalmology makes it impossible to read carefully any of our larger text books on the subject. All that it is possible to do for the student is to make a wise selection of a comparatively few things that he can be effectively taught. These seem to be all included within this book, which contains about as much matter as two numbers of this journal.

With the essentials for the student are included some things which will be of interest to readers who are engaged in special ophthalmic practice. The chapter on "The Lens and Its Diseases" reveals the results of an experience with cataract, that could only be obtained in India. There are observations on its etiology and its clinical forms. There is also a good account of extraction in the capsule—"expression"—the author calls it; which notices the American work done upon the operation, from its introduction by Wright to the late improvements by Fisher. Similarly the chapter on glaucoma gives the results of large surgical experience and a good account of trephining.

It must be noted that this work gives nothing about the technic of major operations on the eye. This has been previously described in Col. Maynard's "Manual of Ophthalmic Operations." The omission of such matter from the present work makes it distinctly better for the medical student and general physician. Each chapter opens with an account of the anatomy of the parts, to the diseases of which it is devoted. This account is not of course a full treatise on the anatomy,

but it does bring up those points that have special relation to the symptoms, and characteristics of the diseases—what might be termed the clinical anatomy. The chapters on "Refraction" and "The Ocular Motor System and Its Defects," deal in a simple direct way with the underlying elements of physiologic optics, without any mathematics that is likely to discourage the student.

The illustrations consist largely of diagrams judiciously chosen from older treatises, the textbook of Fuchs as edited by Duane being most largely represented. There are also some half tones in black and white, which have been retouched and made more or less diagrammatic. The colored plates, however, are chiefly original. A few representing fundus conditions are taken from older works, but the larger part, 50 out of the 60 figures, those representing anterior and external ocular defects and diseases, are new; and reflect great credit on the skill of the artists that produced the originals, and the care and fidelity with which they are reproduced. They compare favorably with those of the kind to be found in any book or atlas of external eye diseases of European origin. They should be an important help to every student seeking to get a clear idea of such conditions.

E. J.

Jubilee Volume Commemorating the Sixty-first Birthday of Professor Doctor J. Komoto, Tokyo, Japan, 1920.

This is a quarto volume, of a remarkable product to Western eyes, for it is printed in Oriental glyphsics. One commences with what is the last page (to us) to read, and here we find a very good portrait of Prof Komoto, in whose honor the volume was published, on his sixty-first birthday.

Komoto is one of the live men in Japan, an oculist of international reputation. His own essays have been abstracted from time to time in this JOURNAL and in its predecessors.

Fortunately, for us who read no Japanese in the original, the book was accompanied by an extensive abstract of

each of the essays, which are by various well known authors. Some of these abstracts will be used in our JOURNAL. They deal, as does Japanese ophthalmologic literature, very largely with statistics, diagnostic methods and laboratory findings. In this the Japanese excel; as did the Germans at one time, from whom many of the leading oculists of Japan received their education.

The work is well printed and bound and on an excellent quality of paper.

H. V. W.

The Eye, Ear, Nose and Throat, edited by **Casey A. Wood, C.M., M.D., D.C.L., Albert H. Andrews, M.D., and George E. Shambaugh, M.D.** The Practical Medicine Series of 1920, vol. III, 382 pp., Chicago, Year Book Publishers.

For the general practitioner, or the worker in special practice other than the branches to which this volume is devoted, it is a most admirable means of getting *en rapport* with the current literature of these specialties. Even those who hold themselves out to the medical profession and the community as engaged in practicing these specialties, but take no special journal, should find this volume invaluable.

Such a publication as this develops from year to year, and this volume is notably superior to its predecessors in certain respects. The part devoted to the eye contains 186 pages. It contains 12 plates and 26 illustrations in the text. The first plate (in colors) is a reproduction on a smaller scale of Plate 1, vol. III of this journal, and makes a very creditable frontispiece. All the illustrations are supplied with legends, which admirably guide the reader to the meaning expressed in the picture.

The scope and proportion of the work are shown by the space devoted to various topics. In a prefatory note the editor urges the importance of the early publication of the Medical and Surgical History of American Participation in the World War. Then 14 pages are devoted to Examination of the Eye. The Hygiene of the Eye takes 5 pages, and the Refraction of the Eye, 15 pages; the Lids

and the Conjunctiva each get 5 pages, while the Lacrimal Sac gets 16 pages; the Sclera and Cornea 5 and the Uveal Tract 13, and the Crystalline Lens 10. Then we find 17 pages on the Retina and Optic Nerve; 10 on the Ocular Muscles, 9 on Toxic Amblyopia and 8 on Glaucoma. Tumors, and Ocular Symptoms of General Diseases, each occupy 6 pages, and Ocular Injuries 11 pages. Military Ophthalmology, Ophthalmic Therapeutics, Ophthalmic Instruments and Comparative Ophthalmology fill the remaining 22 pages.

The book is made more interesting and more valuable by the many pointed comments by the Editor; either adding to the impression made by the authors abstracted, or pointing out the limits to which the views advocated can be safely accepted.

E. J.

Transactions Section on Ophthalmology, American Medical Association, 1920. 276 pages, illustrated, Chicago, American Medical Association Press, 1920.

This volume contains the papers and discussions of the Section at the seventy-fifth annual meeting of the Association, held in New Orleans in April. Its small size, as compared with the similar volumes of former years, reflects the plan of allowing each section to hold but one session each day, giving time for its members to attend other Sections of the Association, in the proceedings of which they may be equally interested. For instance at this meeting the Section of Ophthalmology met in the mornings, and the Section of Oto-Laryngology met in the afternoons; while papers and discussions in some of the other sections were of equal interest to some of the ophthalmologists.

Whether the accompanying advantages more than counterbalance the diminished bulk of the transactions of the individual section, will have to be determined by the experience of the members, and judged by officers of the association. But it is quite within the bounds of possibility, that such a decrease in the size of the volume might occur without any diminution in the total value of its contents. The care-

ful selection of subjects to be presented and the judicious reduction of the size of each paper might make the small volume more valuable than its larger predecessors. Adequate presentation of its subject in fewer words always makes a paper or a volume more valuable. It rests with the officers of the Section and the authors of papers to secure this added value.

With the decrease in the number of papers published in the volume, the reports of Committees published in it become relatively more important. There are six of these dealing with the following subjects: Standardization of Undergraduate Teaching of Ophthalmology. Ultraviolet and Visible Transmission of Protective Glasses. Report of Committee on Knapp Testimonial Fund. Report of Committee on International Congress of Ophthalmology. Report of the American Board for Ophthalmic Examinations. (See p. 51.)

Another point in which the smaller volume represents an increased value, is that the discussions on papers are published in abstract. Very few speakers talk in discussion with the brevity and directness that make the best reading; prolixity, repetition, and circumlocution are apt to characterize extemporaneous remarks. In this volume, many of those taking part in the discussions have written out their remarks and read them, this being made possible by the presession volume published for the section. The remarks made extemporaneously have also been closely edited by some one before including them in this volume. This has added greatly to their value.

In such transactions the discussions ought to be at least as interesting and valuable as the formal papers. In this volume we believe they are. If this is the case, should they not be printed in type of the same size? Page headings and paragraph headings could easily be made to discriminate between paper and discussion. The custom of printing the latter in smaller type, has tended to conceal their value, and prevent them from being as generally read. When they were more wordy, rambling and inappropriate, this was

perfectly proper and distinctly in the interest of the reader. But when the discussion contains the better matter, and in more concentrated form, it certainly should be printed in as large type.

This volume is fully up to the standard of excellence of its predecessors, which are generally known to our readers. The subjects treated herein have been widely published in the Journal of the American Medical Association, in the precession volume and in the program of the meeting. Hence their enumeration here is quite unnecessary. Again we urge every ophthalmologist in active practice to add these volumes to his working library.

E. J.

Taschenbuch Der Augenheilkunde für Aerzte und Studierende. Prof. Dr. Curt Adam, Privat Docent in the University of Berlin. Fourth Edition, with 72 illustrations and 4 colored plates. Urban & Schwarzenberg—Berlin and Vienna—1920.

The popularity of this socalled pocket-book is shown by the necessity of a fourth edition, embracing some four hundred pages. The book occupies a somewhat anomalous position, as it is much too complex and detailed for the average student or general practitioner; but still too brief to be classed as a textbook of ophthalmology. But it contains much clinical observation, and many practical points that can be found in few other books.

In the first five pages, intense emphasis is laid upon two methods of examination: lateral illumination, and illumination of the media by a plane mirror. The next sixty-five pages are devoted to the various medicaments employed in ophthalmology, and the other forms of treatment, both local and general, with especial attention to the forms of systematic treatment necessitated by various types of ocular disease.

The main portion of the book is devoted to a systematic arrangement of the subjective and objective symptoms of ocular disease; starting with the lids and proceeding backward. As the

various signs and symptoms are mentioned, the diseases that could be the cause are taken up and discussed briefly and the necessary treatment outlined at length. Especially good is the chapter devoted to disease of the cornea, while the chapter on iris and ciliary body is woefully lacking in even mention of the etiologic factors that are of such import to a general practitioner. Glaucoma is treated rather lightly, altho there is a good table of differential points of diagnosis between that and symptomatically similar diseases. Diseases of the fundus are not dwelt upon, as the author seems to feel that such cases belong essentially to the highly trained specialist, and do not come within the province of a general practitioner.

A good deal of space is devoted to an excellent chapter on the usual forms of injury to the eye, the diagnosis and treatment being discussed at length. This is one of the best features of the entire book, altho the subsequent chapter on compensation for ocular injury is very weak. An unusual feature is a detailed list of the Blind Institutes of Germany, with a description of each and the requirements for admission. Some two hundred odd prescriptions for the preparations employed in ophthalmology close this practical book, from which much can be gained.

H. S. GRADLE.

Etude Microscopique de l'Oeil Vivant. Prof. E. Gallemaerts, and Dr. G. Kleefeld, Brussels. 80 pages, 11 plates and 3 illustrations in the text. Paris Gaston Doin, 1920.

This study of the living eye is a reprint from the *Annales d'Oculistique*, of a series of papers that have already been brought to the attention of our readers in extensive abstracts (see vol. 3, pp. 538 and 835). They cover much the same ground as the more extended, minute and theoretic papers of Koeppe, which have appeared from time to time in German ophthalmic journals during the last years.

The observations here recorded are made with the binocular corneal microscope of Czapski, on eyes illuminat-

ed by the Nernst slit lamp of Gullstrand. We may well hope that in the next few years all that are of value will be repeated and recorded in our literature in form and connections that will make them of the greatest practical service.

E. J.

CORRESPONDENCE. STANDARDIZATION BY BOARDS OF EXAMINERS.

To the Editor: Organized efforts towards Standardization of the Medical Profession are in vogue, some of which are effective and will ultimate in the highest good. Some societies formed by a Cult or Schism are class organizations of the proletariat of the profession, tend towards commercialism and, as such cannot result in alleviation. Others lead to the establishment of an aristocracy.

The consummation devoutly to be wished lies, as usual, in the happy mean. As we are teaching one another, and learning day by day, as is no other profession, there must be a sort of aristocracy, a kind of selection of those whose life work has proven them to be leaders. We oculists are somewhat apart from the general medical profession—self-segregated specialists. But, as we are part and portion of the profession, we, too, are striving for standardization of our constituent elements. As it has been and is now, we are self appointed specialists, most of us turned by the tools of time and experience into reliable consultants for our brother practitioners, as well as expert eye surgeons.

As we are but human, some of us are not as expert, some not as skilled and some not as ethical as others. Therefore, for the protection of the public, it is proposed to confer upon those who have merited it by their past lives, or upon those who can show by the results of examination that they are specially skilled and worthy of confidence, a sort of D. S. O., in order that the public may be informed, and thus have this stamp of approval in aiding them for the selection of an oculistic consultant.

Who, then, should constitute Exam-

ining Committees for these distinguished honors? It is impossible to use democratic tactics by a general vote. We, therefore, have to resort to republican methods, selecting thru a few men, Boards of Examination. Such has been done by the American College of Surgeons and by the American Board for Ophthalmic Examinations, the latter constituted by appointment from the Section on Ophthalmology of the American Medical Association, the American Ophthalmological Society and the American Academy of Ophthalmology and Otolaryngology. As wise a selection has been made, as was possible.

For young and untried aspirants, this is indeed a good method. But for the older men, who in the course of fifteen, twenty, thirty or forty years, have made their names good, with the consequence of a few friends and multitudinous enemies, the task of the Boards is indeed difficult and at times gives rise to the suspicion of inequity. To quote a case from civil life: Is it possible that a well-known, active, enterprising politician of mature years could "get thru" without a more or less great number of enemies, great or small? And, is it possible that such a man could gain admittance to an exclusive club or secret society, without some negative votes being cast in his disfavor, despite his eminence and the good he may have accomplished for the community?

Such is, indeed, the condition when we come to selection of the older men for our exclusive medical societies and honors. It is a striking observation, characteristic of the American people, that we do not always praise a leader; but more often criticise his performances and, if he has any failings, they are magnified and brought out to public view.

It is not to the credit of the several exclusive medical associations, that they have in some cases either excluded, or held in abeyance, the names of men who have not only national, but international reputations. The "dossier" of any prominent man will be found to include not only commendations, but also some true and many untrue alleged observations, of which our selective officers cannot be personally cognizant.

Another weakness of this form of election, is the fact that, tho these special men have received official invitations to apply for registration with these societies, when refused or if their names be held without action, they have personally no means of refuting allegations which they may surmise, or which may leak out to them; as the proceedings of the Boards are conducted in a secret and un-American manner.

Some way must be found out of this muddle and the only way is by open diplomacy and not by star-chamber methods. Altho the majority of these older men have no particular use for, or need the approbation of an additional medical society or organization, it is a cause for unfavorable comment and wonder upon the methods of these organizations, to see in some instances, unknown, unskilled and unethical members sporting letters after their names, on their office cards, doors and stationery, and, when occasion allows, in the public press.

Be this as it may, the attempted standardization of the medical profession and, with it, of the oculists, by these organizations; and more particularly by the standardization of hospitals and of their visiting surgeons, has already accomplished marked good and is an uplift to the submerged part of the profession, that has not yet been admitted within the sometimes golden gates that have been opened to others.

HARRY VANDERBILT WURDEMANN,
M.D., F.A.C.S.

Seattle, Wash.

VIENNA CLINICS.

To the Editor: During my recent visit to Vienna, I went to the Allgemeines Krankenhaus, which looked about the same as it did a quarter of a century ago, except that a lot of kalsomining and painting would improve the appearance of the building. The court-yards had many temporary barracks that were used during the war; now some are used for ambulatory work. The first and second eye clinics were in the same location as years ago.

The second eye clinic (formerly Prof. Fuchs) is now in charge of Prof.

Dimmer. Prof. Dimmer and his staff of assistants received me with the utmost courtesy and permitted me to see all there was to be seen there. The clinics are perhaps not as large as in prewar times, as permits to enter Austria from Galicia and other former Crown lands are difficult to procure, and previously a large number of ambulatory patients came from the outside. For the same reason the trachoma station was not overcrowded.

Docent Dr. Lindner and assistants showed the same interest in their work as we were accustomed to observe. The assistants are paid the beggarly sum of 800 crowns (\$3.00) a month while the orderly (Diener) receives more. One of the assistants tried to get an increase in salary, but was told by representatives of the Socialistic Government that as he was not doing any physical labor he could not expect more. The doctor pointed out that the turning over of a couple of hundred eyelids daily required some physical exertion, this did not meet with the approval of the official.

After having spent some very interesting and instructive weeks at the clinic, I was told by Dr. Lindner that Prof. Neumann (otologist) had sent a letter he had received from Prof. Killian in which the latter asked his Austrian colleagues not to permit Americans to do postgraduate work in the clinics. He mentioned that Prof. Hajek (rhinologist) had already signified that he would exclude Americans from his clinics. I asked for the reason and was told that it was some sort of reciprocity, as many American Societies had cancelled the honorary memberships of German medical men.

I called on Prof. Neumann and he showed me the letter of Prof. Killian. He said he would continue to instruct Americans as before. While in his office, three young American doctors came in to have him sign their certificates of attendance. These certificates were already signed by the Dean of the University of Vienna and by Prof. Hajek, proving that the latter will not turn away American students. Hofrat Dimmer then told me

that he would gladly receive Americans in his clinics, unless he should receive contrary instructions which are not likely to be issued. I was the only American in this clinic and another American was working as hospitant in Meller's clinic.

Soap was not abundant while I was at Dimmer's clinic. Instruments need replenishing. Foreign literature is prohibitive on account of the low value of the crown, for instance, the American Journal being \$10.00 or 3,000 crowns. As this department only receives 5,000 crowns a year they cannot buy many foreign journals. Books bought in Vienna and sent to foreign states are taxed 200%. Germany also has a tax on the export of books.

I have profound hopes that Vienna will in time regain its place among the centers for postgraduate studies on the continent. All the men seem to work with enthusiasm and assiduity and look forward to better times.

Sincerely yours,
H. AUFMWASSER.

Denver, Colo.

CERTIFICATES IN OPHTHALMOLOGY.

At its recent meeting in Kansas City, the American Board for Ophthalmic Examinations conferred its certificate upon the following applicants:

Baer, Benjamin F.	Philadelphia, Pa.
Ball, M. V.	Warren, Pa.
Bankes, Claude W.	Reading, Pa.
Boerner, Morris H.	Austin, Tex.
Blake, Eugene M.	New Haven, Conn.
Brown, H. Alexander	San Francisco, Cal.
Buck, Robert H.	Chicago, Ill.
Burch, Frank E.	St. Paul, Minn.
Clement, Charles C.	Chicago, Ill.
Dickson, John F.	Portland, Ore.
Dunlap, Lawrence G.	Anaconda, Mont.
Esterly, Daniel E.	Topeka, Kans.
Fairing, John W.	Greensburg, Pa.
Finnoff, William C.	Denver, Colo.
Fisher, Carl	Devil's Lake, N. D.
Fisher, Frank	Philadelphia, Pa.
Friedenwald, Harry	Baltimore, Md.
Fuller, Theron E.	Texarkana, Ark.
Harrell, Richard F.	Shreveport, La.
Harris, Clarence M.	Johnstown, Pa.
Jones, Leonard W.	Rochester, N. Y.
Lemere, Henry B.	Omaha, Neb.
Luedde, William H.	St. Louis, Mo.
McGuire, Hunter H.	Winchester, Va.
Miller, Clifton M.	Richmond, Va.
Monson, S. H.	Cleveland, Ohio
Moulton, Herbert	Fort Smith, Ark.
Olsho, Sidney L.	Philadelphia, Pa.
Post, Lawrence T.	St. Louis, Mo.
Post, Martin H.	St. Louis, Mo.
Roberts, William H.	Pasadena, Cal.
Scales, J. William	Pine Bluff, Ark.
Schenck, Charles P.	Ft. Worth, Tex.
Schwartz, William A.	Phoenix, Ariz.
Scott, Charles J.	Marietta, Ohio
Shreve, Owen M.	Erie, Pa.
Sleight, Raymond D.	Battle Creek, Mich.
Spalding, James A.	Portland, Me.
Stevenson, Walter	Quincy, Ill.
Tooker, Charles W.	St. Louis, Mo.
Van Kirk, V. E.	Pittsburgh, Pa.
Weih, Elmer P.	Clinton, Iowa
Wible, Elmer E.	Pittsburgh, Pa.
Woodruff, Frederick E.	St. Louis, Mo.

ABSTRACTS

Sir James W. Barrett. *Fleeting Amaurosis in Children.* Medical Journal of Australia, Aug. 28, 1920, p. 196.

A girl of 9 had an attack of influenza. On return to school after two weeks she found that she could not see the blackboard. Her sight was better in a dim light than in a bright light. She had considerable difficulty in lifting her eyelids, and considerable pain in her head and eyes.

When examined, both pupils were widely dilated and fixed. The fundus and media were normal. The vision was as follows: right, 6/36; left, 6/60.

Two days later the vision rose to 6/9 on both right and left sides, but the pupils were still inactive and dilated. Complete recovery took place eight days after the first examination.

The case is remarkable, and corresponds to the type known as acute cerebral, or postconvulsive, amaurosis, first described by Nettleship (1884) and Gay (1893). The disease then remained practically unrecognized until Sydney Stephenson discussed it fully in 1905. The usual story is of a convulsion, followed by total blindness, absence of fundus changes, with fixed and dilated pupils.

Recovery of vision takes place, in the majority of cases after an interval of total blindness, sometimes extending over months. The better term for the disease is that applied by Stephenson, "fleeting amaurosis."

It is attributed to disturbances in the visual cortex, but this hypothesis fails to explain the dilatation and fixation of the pupil. The motor disturbances, ptosis or retraction, met with may be explained by involvement of the motor cortex. The case recorded is that of a nervous child, who had no definite convulsion, who is much older than is usual in such cases and in whom the loss of vision was partial and of comparatively brief duration. Barrett has seen several cases previously in infants and in young children, with recovery in every case.

L. Guglianetti. *Corneal Ulcers Due to the Meningococcus of Weichselbaum.* Archivio di Ottalmologia. Nov.-Dec., 1919, v. 26, No. 11-12, p. 641.

The author describes the case of a girl 11 years old in whom a corneal ulcer developed on the thirteenth day of epidemic cerebrospinal meningitis. The ulcer extended, including the lower half of the cornea and finally healed after a Saemisch incision and xeroform applications. The meningococcus, which had been found in the spinal fluid, was found in smears and cultures from the ulcer. The first examination showed also staphylococci, but a later scraping from the deeper parts showed only the meningococcus. Growth was typical of this organism, and agglutination was positive with antimeningococcic serum. Inoculation on the abraded cornea and in the anterior chamber of rabbits produced in the first case severe hypopyon ulcers, and in the second iridocyclitis with hypopyon.

He quotes two authors who have observed this complication in cerebrospinal fever, but states that one, Cantonnet, did not find the organism, while the other, Anargyros, found it in the conjunctival secretion of two cases but associated with the pneumococcus.

In the case of Moisonnier, who found Gramnegative diplococci in smears only of the secretion of an otherwise healthy person with corneal ulcers, he considers that the diagnosis of meningococcus was unwarranted and that the distinction between micrococcus catarrhalis and the meningococcus is not possible without cultures. This would make the author's case, he thinks, the first in which the meningococcus was proved to be the cause of corneal ulcer.

S. R. GIFFORD.

Botteri. *Peculiar Case of Polycoria.* Klin. M. f. Augenh., v. 64, January, 1920, p. 106.

The upper third of the light grey iris of the right eye and a small zone at

at the lower periphery of the iris were distinctly brown, below this a black nevus. The pupil was missing at the regular place, but in the lower temporal third of the light grey tissue, which looked like atrophic, but thickened, iris, there were 2 oval horizontal openings, separated by a bridge, 1.50 mm. wide, the pupils of this eye. The more central pupil had a normal pigment seam, the temporal pupil showed ectropion of the pigment layers. On the anterior capsule of the lens were dust like, diffusely scattered, pigment dots. Both pupils, especially the more central, reacted promptly to light and accommodation, their vertical diameters becoming smaller, the horizontal diameters remaining almost unfluenced. Upon atropin, both pupils became nearly round. V. R. + 2.50 = 6/6.

The left iris presented a similar condition of 2 colors, but 3 pupils in the form of horizontal fissures: a lower nasal, which was the shortest, a more central, and a higher temporal, the largest. All were lined by a pigment margin and separated by iris parenchyma. Atropin dilated all pupils to pear shape. V. + 1 = 6/6. The ophthalmometer showed astigmatism R. 70° and 160°, L. 15° and 105°. Fundi without pathologic changes.

The case differed from the usual forms of polycoria, which consist in several, generally radial, fissures, besides the round pupil at the normal site.

C. Z.

A. J. Cemach. The Cochlear Reflex.
Beit. z. Anat. Physiol., Path., u. Ther. d. Ohr, d. Nase u. d. Hals., 1920, v. 14, p. 1-82.

The author describes the following reflexes: (1) The otogenic pupillary reflex. By this is meant a rapid narrowing of the pupil followed by a slow dilatation caused by the action of sound. It is found in 27% of normal persons, and is not influenced by the will. Women, children and nervous people show it best. Tuning forks, etc., produce it best, while such intensive

sounds as a fog horn are almost without effect. It is not found in absolutely deaf patients, but is found in deaf mutes with remnants of hearing. (2) The aural palpebral reflex, is a movement of the lid varying from a slight twitch to a forcible closing of the eye, and is found in 95% of normal persons. It is controllable by the will, and is less apparent after testing several times. It is best elicited by sounds like a pistol shot, also by tuning forks with a high note. It is absent in total deafness, but present where there is any remnant of hearing. Three others, the conchal, the tensor and the general muscular reflexes have no clinical significance.

C. L.

C. C. Sinha. Bacteriologic Investigation of Normal and Diseased Eyes.
Indian Med. Gazette, August, 1920, p. 288.

The eyes of 100 consecutive patients were examined by smears on slides and by cultures on agar. Dr. Sinha thinks, as a result of his investigations, that microscopic examination of a stained film is generally sufficient for the diagnosis. The varieties of organisms found by him in healthy eyes and eyes suffering from different forms of conjunctivitis, corneal ulcers, etc., agree with the observations made and recorded by others.

The following conclusion should hardly be allowed to pass. It is based on two cataract patients in whom pneumococci and streptococci were present, being successfully operated upon after a few days' treatment with protargol. He says: "Thus it appears that the presence of pyogenic organisms, even pneumococci, is no contraindication to cataract operations, provided the patient undergoes systematic treatment preliminary to operation." He should have added, "if the conjunctival sac is then found free from the organisms in question." To operate on such eyes without making sure of this is to court certain disaster.

F. P. M.

S. Baldino. *Arcus Juvenilis of the Cornea Associated with Changes in the Fundus.* Arch. di ottal. v. 27, 1920, p. 50.

The author's case was a man of 33 in whom the change had begun on the right cornea, down and out, eight years before, with the same condition affecting the left eye symmetrically two years before. Vision began to fail shortly after the first objective signs, and for four years the patient complained of night blindness. When first seen, vision was R. $\frac{1}{3}$, L. $\frac{1}{3}$. Both corneae presented similar white rings near the limbus with a few fine white dots inside the ring, in the superficial layers of the cornea. There was irregular astigmatism, not improved by glasses. Both fundi showed large patches of displaced pigment at the periphery with a few smaller spots more centrally. The left eye showed a raised plaque of connective tissue up and in from the nerve, considered probably a hyalin rest. His case agreed with two of Casolino's cases in giving a probable history of hereditary clues.

The author thinks the condition a change similar to arcus senilis, due to disturbed nutrition of the cornea, the result of a constitutional malady. Apparently no cases have been reported with similar fundus changes. A bibliography is appended.

S. R. GIFFORD.

Engelking, E., and Eckstein, A. *New Color Test Objects for Clinical Perimetry.* Klin. M. f. Augenh., v. 64, May, 1920, p. 664.

The authors had their test objects

(described *ibid.*, Jan., 1920, p. 88) published by Speyer and Kaerner, Freiberg, Br., 1920, price 7 Mark. In testing, in good daylight, with these, from the periphery towards the center, all objects at first appear equal, viz., of the tone and illumination of the grey pattern: they are "periphery—equal," and the colorless limit of the visual field for the 5 colors lies at the same point.

At the transition from grey to color they assume their final color tone which does not change in the entire color field. The color limits for red and green, on the one hand, and for yellow and blue, on the other, coincide so that there are two possibilities, e. g., the red and green objects, to obtain the same color visual field. A premature recognition by secondary signs is excluded. The complete visual field consists of (1) the colorless limit, (2) the yellow-blue limit, (3) the red-green limit. Thus, perimetry with these objects is not only physiologically correct, but also very much simplified and easier. The qualities of the colors, of course, are exact only for a certain neutral illumination, but sufficiently so for all practical cases. C. Z.

de St. Martin. *Four Recent Observations of the Ocular Symptoms of Botulism.* Ann. d'Ocul., 1920, v. 157, p. 193.

The author reviews the symptoms as described by Van Ermengem in 1897 and reports in detail four cases who suffered from botulism as the result of eating smoked trout, Aug. 1, 1918. The ocular symptoms as grouped by the author were:

Symptoms and their duration	Case 1	Case 2	Case 3	Case 4
Ptosis	40 days	5½ mos.	4½ mos.	4½ mos.
Ophthalmoplegia Ext.	40 days	.....	.....	.....
Mydriasis	4½ mos.	.....	4½ mos.	.....
Paralysis of Accommodation.....	4½ mos.	4½ mos.	4½ mos.	.....
Hyperemia of disc.....	4½ mos.	5½ mos.	4½ mos.	4½ mos.
Contraction of fields.....	5½ mos.	5½ mos.	5½ mos.	5½ mos.
Amblyopia and asthenopia.....	4½ mos.	5½ mos.	40 days	4½ mos.
Asthenia	5½ mos.	5½ mos.	4½ mos.	5½ mos.

He regards the symptoms as dependent for the most part on lesions of the cord, medulla and cranial nerves, toxic or hemorrhagic in nature. The visual symptoms are probably due to the direct action of the toxins on the retina, altho experiments on animals have not proven this.

C. L.

H. Coppez. Avulsion of Optic Nerve During Sinus Operation. Le Scalpel No. 40, October 2, 1920.

Following resection of the middle turbinate bone in a man of 36 years there was abundant hemorrhage; arrested by plugging the nostril which provoked severe retroocular pain. Some days later, on opening the maxillary sinus by the nasal route a great quantity of pus escaped.

Immediately after the latter operation, tumefaction, immobility and protrusion of the eyeball occurred, with abolition of vision. Some days later, curettage of the ethmoid showed that it contained three tampons of wadding. There was temporary improvement followed by increase of the pain and inflammatory phenomena in the orbit of that side. On exploration the last remaining tampon was removed, saturated with pus and blood.

The pain continued, with exophthalmos, ptosis, immobility of the eyeball and pupil, and vision was abolished. On ophthalmoscopic examination the papilla had disappeared, being replaced by a continuous white plaque. Certain indistinct branches of the central retinal vessels reappeared at a distance of two diameters from the papilla.

In the course of the operation for the radical cure for sinusitis, which had been done, the inner wall of the orbit had been perforated, causing in fact a case of avulsion of the optic nerve.

DANIS.

T. Mohr. Avulsion of Optic Nerve by Blunt Force. Klin. M.f. Augenh. v. 64, 1920, p. 310.

A potato was hurled against the right eye of a boy aged 17, four days previously, causing intense pain and loss of consciousness. Vision 0. On account of abundant opacities of the

vitreous a whitish zone around the disc could be seen only indistinctly. After two weeks an almost round hole, about 9 D. deep, with sharp margins, was seen at the place of the disc. At the temporal peripapillary zone three fine gray concentric rings apparently represented, as shown by parallax, the gradual incline from the retina to the margin of the hole. Behind the upper margin of the excavation a white membrane appeared, in the form of a segment with sharp straight free border, which grew broader within the following days.

The patient had a typical pygcephalus with bilateral exophthalmos. In this anomaly the optic nerve frequently is held very tight in the narrowed optic foramen. In some such cases the orbital portion of the optic nerve forms with the intracranial, in consequence of the lower sella turcica, an angle open downward thus interfering with its mobility. When the exophthalmic globe was struck on a tangent, its posterior segment was intensely rotated to the right. As the optic nerve tightly enclosed in the optic foramen would not give way, a violent traction took place at its entrance into the globe. The intensely increased intraocular pressure at the moment of impact sufficed to rupture the lamina cribrosa and press the optic nerve back. The sharp margin of the hole, its depth, and later ampullar enlargement indicated that the optic sheath was not torn, only the nerve which glided backwards within the sheath. If the sheath had also been ruptured there would have been no hole noticeable as it would have been filled with the orbital contents and the eyeball would have collapsed.

C. Z.

E. Charles. Removal of Filaria from under Conjunctiva. Indian Medical Gazette. Oct., 1920, Vol. LV, p. 378.

A Hindu, age 45, 8 mos. previously had sudden severe pain in R. E., followed soon after by swelling on inner and lower side of eyeball. The neuralgic pain subsided at night when it was cold, but increased in the daytime.

The swelling was very painful and red. There was lacrimation and dilated pupil. Vision was affected. The worm was removed under cocaine. Major Sewell, I.M.S., of the Zoological Survey of India, reports on the specimen, which was so contracted and shrunken from being preserved in spirit, as to throw doubt on the conclusions. It appeared to be a female filaria, and shrunken, measured 33 cm. long by 2 mm. in most of its length. A technical description of the specimen follows. It is stated that the normal hosts of filaria conjunctivae are the horse and the ass.

F. P. M.

T. M. Li. Practical Considerations in Refraction. National Medical Journal of China, Vol. 6, No. 2, June, 1920, p. 108.

After giving a summary of the indications for refraction, Li gives a report on several of his interesting cases, to prove that there are many factors that must be considered if the patient is to secure relief from his symptoms. His experience convinces him of the necessity for thorough cycloplegia in the great majority of cases, and also an accurate determination of any muscle imbalance before prescribing correcting lenses.

Li has examined a large number of Chinese students. He does not give the number, but of those having errors of refraction, he found 53% with myopia, 36% with hyperopia, and 11% with mixed astigmatism. He states that "the high percentage of myopia found among Chinese students may be due to the peculiar construction of the Chinese characters and the close application necessary in learning how to read and write them."

"Reading the characters does not tax the eye so much as writing them. In China, to be able to write well is quite essential in one's education, which is judged largely by one's penmanship. In order to be able to write well every dot, stroke, and turn, made by the pen must be carefully manipulated and observed. One has to put in long years of diligent practice to acquire this art. In former days, as it is to a great ex-

tent nowadays, a student was considered disrespectful if he wore glasses in the presence of his teacher. In the different ministries of today when an inferior goes to interview his superior, he has to approach him without glasses, according to usual custom and good manners. Poor hygienic surroundings, usually found in a Chinese classroom, such as poor light, lack of fresh air and proper physical exercises, faulty position and long hours of study are also important factors in the possible production of myopia."

H. J. H.

G. Wunderlich. Quinin Intoxication and its Pathogenesis, with Report of a Case. Klin. M. f. Augenh., v. 64, March-April, 1920, p. 270.

A girl, aged 24, after taking 8 grains of quinin, suddenly fell sick with vertigo, tinnitus, vomiting, diarrhea, and loss of consciousness. The next morning, she was completely deaf and blind. Five days later, she was brought to the clinic: V. R. = 5/15. V. L. = perception of light, maximal mydriasis, retinal vessels normal, and slight peripapillary opacity, optic discs of normal color. V. and visual fields gradually improved, so that at her discharge V. R. was 5/5; L. 5/20 (impaired by a scar of the cornea). At the same time the retinal vessels grew smaller and the discs became white, the palpebral fissures were wide, mydriasis persisted with slight reaction to light, visual field contracted, hemeralopia.

From his observations in this case and a discussion of the literature, W. reached the following conclusions: Quinin is a strong protoplasmic poison, which attacks with predilection the eyes and ears.

It primarily damages the nervous elements of the eye, as in W.'s case: the ganglion cells, the inner granules, neuroepithelium, optic fibres, perhaps also the central ganglion. It irritates the sympathetic, causing mydriasis, insufficient reaction of the pupil, ischemia of the retinal vessels, and damages to the vascular muscles. After longer persistence of ischemia, secondary

lesions of the nervous elements and anatomic alterations of the vessels (perivasculitis and changes of position).

The phenomena of optochin poisoning are analogous and due to the same pathogenesis.

C. Z.

F. M. Boehm. Operative Treatment of Keratosis of Conjunctiva and Cornea. *Klin. M. f. Augenh.* v. 64, March-April, 1920, p. 234.

Epithelial xerosis is distinguished from parenchymatous xerosis. The first consists in a generally localized and benign alteration of the conjunctiva, which appears like silk as if covered with white fat. Parenchymatous xerosis develops after severe destructive diseases of the conjunctiva—trachoma, diphtheria, pemphigus, cauterizations, ectropium and lagophthalmus. Elschnig proposed for it the term keratosis, as it consists, like keratosis cutis, in a real cornification. Vision is reduced to perception of light and by the shrinkage of the conjunctival sac the motility of the eyeball and the closure of the lid is impaired. It is considered an incurable disease.

The partial closure of the palpebral fissure by sutures, introduced by Rudin, attains the two goals of treatment; retention of the tears and reduction of the surface of evaporation. Boehm reports in detail 3 cases, in which this was done 4 or 5 times, with good results.

The lids are divided from both sides by intermarginal section into two plates; leaving a small opening at the lacrimal region and a central fissure from 8 to 10 mm. long. The upper and lower lids are united by simple and mattress sutures. In 10 out of 14 cases the process was arrested, and such an improvement obtained that the patients were at least partly enabled to work again.

C. Z.

Carl Behr. Ophthalmomyiasis Interna and Externa. *Klin. M. f. Augenh.* v. 64, 1920, p. 161. (ill.).

In a boy, aged seven, at the latter part of August, a circumscribed ap-

parently phlyctenular irritation developed with swelling of the cheek and palpebral conjunctiva, which in its further course led to a nodular prominence of the sclera and severe intraocular phenomena arousing the suspicion of tuberculosis or glioma. On account of blindness and the severe inflammation, the eye was enucleated.

The anatomic examination revealed the presence of the larva of a fly, most likely hypoderma boris. Subretinal immigration had caused intense choroiditis and complete detachment of retina. The choroiditis was not purulent, but characterized by eosinophiles.

After discussion of the literature of this rare affection, the author summarizes: The larvae of Oestrus, especially Hypoderma boris, which as a parasite enters the body of warm blooded animals in summer or beginning autumn for hibernation, may in rare cases also invade the human eye. So far it has been observed only in children, probably on account of their more tender sclera. Generally, they are deposited in the surroundings of the eye, soon penetrate the skin and wander to the eyeball, whose outer covering they pierce. They do least harm, if they enter the anterior chamber, in which they can be easily diagnosed and extracted.

If the larva penetrates the eyeball farther back its immigration may be revealed by circumscribed phlyctenular irritation, and later by the development of a scleral nodule. This is the last moment in which the eye may still be saved, by incision of the nodule and extraction of the larva. After its entrance into the anterior, opacities of the vitreous and detachment of the retina at once develop; which prevent ophthalmoscopic examination and render diagnosis and therapy illusory. The eye is irrevocably lost and on account of irritation and amaurosis requires enucleation. It shows extensive iridocyclitis.

The ophthalmomyiasis externa observed as frequently in adults as in children, is a relatively harmless af-

fection caused by different parasitic larvae of flies. Generally the invasion occurs by the female flying against the eye and depositing its eggs. Conjunctivitis develops with swelling of follicles and formation of membranes. This disappears rapidly after removal of the usually large number of larvae.

C. Z.

Zur Nedden. Therapeutic Effect of Paracentesis of the Vitreous in Intraocular Diseases. Klin. M. f. Augenh., v. 64, May, 1920, p. 593.

Zür Nedden reports further good results from his method, of withdrawing with Pravaz's syringe from 0.5 to 1. ccm. of the liquified vitreous, in opacities of the vitreous remaining after traumatic (not spontaneous), hemorrhages, in chorioretinitis, choroiditis disseminata, and in ectogenous infections after perforating injuries.

So far he has performed paracentesis 65 times on 21 eyes, mostly ambulant cases. Adherent opacities can not be removed by the syringe. They as well as the compact stripes after hemorrhages and retinitis proliferans gradually disappear after repeated paracenteses, which improve absorption by renewal of the vitreous. Cyclitic membranes are very refractory to this treatment. In some cases no harm was done to the eyes. The author examined the aqueous and vitreous repeatedly drawn before enucleation from an eyeball affected with traumatic glaucoma and one after a perforating injury; and found that the aqueous and vitreous of not inflamed eyes contained no fibrin in contrast to the eyes of rabbits. His observations proved, that by paracentesis of the vitreous some eyes threatened in their existence, can be saved, and that some, which in consequence of dense opacities of the vitreous were according to our present views considered as blind, regained good vision.

C. Z.

E. Engelking. Family Polycythemia with Ocular Affections. Klin. M. f. Augenh., v. 64, 1920, p. 645.

Engelking reports the history of a family in which chronic polyglobulia, partly with most intense alteration of the blood, could be traced thru three generations. In all cases typical polycytemia, (Vaquez' disease), existed, without heart trouble, changes of the kidneys, or increased blood pressure. The hereditary transmission was direct to both sexes. The affections of the eyes were typical and distinguished from the usual aspect in *morbus ceruleus* (due to congenital heart trouble). The ocular and palpebral conjunctivae was vividly discolored. The retinal vessels were scarcely changed in caliber and course. The veins were very dark—almost blackish red, the optic disc ruby red from extension and greater filling of the smallest veins and capillaries of the disc and retina. These colors were due to the congestion of the blood and proportional to the number of the red blood corpuscles to the area. There were no optic neuritis or choked disc, nor signs of inflammation or congestion of the retina. The color of the eyeground was bluish red, cyanotic, which Engelking ascribes to the changes in the capillaries of the retina and choroid.

In *morbus ceruleus* tortuosity and general extension of the retinal veins are characteristic and distinguish the polyglobulias in congenital heart affections from the genuine polycytemia. If this varicosity of the retinal veins occurs in polycytemia, as observed in several cases, Engelking considers it as secondary, caused by wear and tear of the system from overloading, a sign of advanced age of the polycytemic, so to speak, because it was not encountered in his young patients. According to Engelking, polycytemia is a disease of the erythropoetic apparatus from, in his cases, hereditary disturbance of the endocrinie equilibrium.

C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS.

Willard N. Bell, Ogdensburg, New York, aged sixty-three, died October 25th, from pneumonia.

A. Benedetti, Docent of Ophthalmology at Rome is dead.

John A. Dillon, Springfield, Massachusetts, aged forty-two, died suddenly September 12th, from heart disease.

Alanson W. Hawley, ophthalmologist and oto-laryngologist, of Seattle, died at the age of fifty-six, of angina pectoris, at Kalamazoo, Michigan, having stopped over on his way home from the American Academy meeting at Kansas City. He practiced the specialty in Seattle for sixteen years, was a member of the American College of Surgeons, American Medical Association, Puget Sound, Pacific Coast, and American Academy of Ophthalmology and Oto-Laryngology.

PERSONALS.

Dr. Theodore Eugene Oertel announces removal of his office to Rooms 1005-8 Lamar Building, Augusta, Georgia.

Dr. E. H. Carey, of Dallas, Texas, presided at the fourth annual session of the Southern Medical Association, in Louisville, November 15-18.

Dr. Walter K. Seelye of Seattle announces that Dr. S. D. Maiden is now associated with him in the practice of ophthalmology, rhinology and oto-laryngology.

Dr. George F. Suker of Chicago wishes to state that he did not accept the commission as Major in the Regular Army, tendered him by the Adjutant General, as reported in last month's issue of this JOURNAL.

Dr. Harold Gifford of Omaha expects to sail for South America in December, where he will join Dr. Casey Wood for research work in comparative ophthalmology, at the tropical station in British Guiana.

Lieutenant Colonel Henry Smith I.M.S., Retired, has cabled to Dr. D. T. Vail, Chairman of the Eye, Ear, Nose and Throat Section of the Ohio State Medical Association, his acceptance of the invitation to be the guest of honor of the Section at the next annual meeting of the State Society to be held at Columbus May 3rd, 4th and 5th, 1921, and to deliver the oration on ophthalmology.

Colonel Smith has retired from Indian medical service and will no doubt make a tour of the United States in the spring and early summer of 1921. His vast experiences as a general surgeon and especially as a cataract operator, together with his long years of service as the chief medical officer of the Amritsar District, Punjab, India, will make his visit to the States one of great interest to the profession at large.

SOCIETIES.

The Colorado Ophthalmological Society elected officers for the ensuing year. This society has no president, the chairman of each meeting is chosen at the time.

The Rhode Island Ophthalmological Society elected officers for the ensuing year as follows: President, Alya A. Fisher; Vice President, Christopher J. Astle, and Secretary-Treasurer, Joseph L. Dowling, all of Providence.

At the regular meeting of the Chicago Ophthalmological Society, November 15th, 1920, a paper was read by Dr. G. F. Suker on an "Unusual Case of Retinitis Pigmentosa," and by Dr. Robert Von der Heydt on "Microscopy of the Living Eye as Seen with the Nernst Slit Lamp of Gullstrand. This paper will appear in full in an early number of the JOURNAL.

At a joint meeting, November 18th, of the Section of Ophthalmology with the Section on Rhinology and Oto-Laryngology of the College of Physicians of Philadelphia, Dr. J. Parsons Schaeffer by invitation read a paper on "The Anatomic Relations of the Optic Nerve and Optic Commissure to the Paranasal Sinuses," with a lantern demonstration. The discussion was opened by Dr. James Bordley, Jr., of Baltimore.

MISCELLANEOUS.

A curious instance of extreme color blindness recently came to light. A post office clerk could never balance his accounts. Examination proved that he was unable to distinguish between the colors of the stamps he sold.

The Valentine Haüy Association for the Welfare of the Blind has deposited in six municipal libraries in Paris a collection of special books printed in braille type, to be placed at the disposal of blind readers.

The French Minister of Hygiene recently directed the attention of the Academie de Medecine to the frequency of trachoma in certain regions of France, especially around Marseilles.

Sir William and Lady Lister have made a donation of £5,000 to the Royal London Ophthalmic Hospital for the purpose of starting an ophthalmic convalescent home in connection with the hospital.

The Graduate School of Education, Harvard University, will conduct a course of instruction to train workers for teaching the blind and working with them. Further information may be obtained from the executive secretary, Miss Lotta S. Rand, 17 Lawrence Hall, Harvard University, Cambridge, Mass.

The Milwaukee County Dispensary has changed its personnel arrangement for professional services for its patients in ophthalmology. Formerly a number of ophthalmologists were in attendance alternating on different days of the week. Now a full term-paid clinician and two assistants are employed.

At the annual meeting of the members of the Permanent Blind Relief War Fund for Soldiers and Sailors of the Allies, the chairman of the executive committee, in his address stated that since its creation in 1916, the sum of \$1,796,314.44 had been collected. This is said to be the largest total contributed to any American war relief organization outside of the Red Cross. The Fund has in hand upward of \$450,000. The total number of members exceeds 17,000.

Prior to 1914 practically all the optical glass in the United States was imported from Germany. As a result of experiments begun at the outbreak of the war, under the auspices of the geophysical laboratory of the Carnegie institution in Washington, optical glass of fine quality is now to be had on this side of the water. At first disks of three inch diameter were made. Since February of the present year one optical glass concern has listed twelve-inch disks for short-time delivery. The great difficulty to overcome is to prevent cracking of the disk in the annealing process, several flawless ones were made but were ruined in this way. An electric furnace of special design has been devised which has solved this problem, so that it is believed the last difficulty has been overcome in the way of American manufacture of the largest disks.

Those of our readers who are not subscribers should send in their names for the "News Letter," published free by the National Committee for the Prevention of Blindness, 130 East Twenty-second street, New York City. It should be a great satisfaction to us that laymen are in charge of this work, and it should be our pleasure to cooperate and assist in every way possible. The least we can do is to subscribe for the "News Letter" and

keep posted upon what the "Committee" is doing throughout the country to prevent blindness and to help those who are blind.

The Maryland Workshop for the Blind has requested an increase of \$3,000 in its municipal appropriation, now amounting to \$5,000 a year, to supplement the state appropriation, which has been increased from \$14,000 to \$16,000. Among the 200 blind men and women cared for, 154 are from Baltimore.

Dr. Blanche Norton has been awarded the Cross of King George I by the Greek government, in recognition of her work for victims of trachoma in Greece. For the last year, Dr. Norton has been engaged in trachoma eradication work in Trebizond and Constantinople, under the auspices of the Near East Relief. In the course of her service Dr. Norton contracted the disease herself and altho not fully recovered, she has returned to the United States.

During the last summer, in a trachoma survey carried on throughout Arkansas under the auspices of the United States Public Health Service, out of 1,451 persons examined in ten counties, 262 were found afflicted with trachoma. It is estimated that at least 40 per cent of the blindness in the state is caused by trachoma. The greatest number of cases, 108 out of 746 examined, was found in Searcy County. No cases were discovered in Ashland County out of 313 subjects examined.

LIGHTING. The beauty of a pretty workgirl is not enhanced by huge goggles, nor is a young man made more prepossessing by their use. Yet, in the long processions lunchwards, homewards, which trips and stumbles and strides thru our streets, there are hundreds wearing glasses. If asked by the oculist as to the lighting of store or factory or office the ready answer will be that there is "plenty of electric light; quite a glare of it." But the oculists on the Board of the Industrial Accident Commission define light as "that quantity and quality which enables normal eyes to work without discomfort," and they are trying to make employers see the economic advantages of supplying this.

When the light is insufficient the eye keeps changing its focus in a vain effort to detect details. This constant drawing up and releasing action of the fine muscular construction results in strain and definite fatigue. Also, a bright light suspended in the line of vision, or a sharp contrast and flickering on the eye gives the extra work of constant adjustment. This is not only a serious strain, but introduces a neutral stage of the pupil action by the lagging of tired muscles, which results in a momentary, partial blindness, making it almost impossible for a worker to observe the graduations of a precision instrument or lay out fine work in detail.—*New York Medical Journal*.

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EFFECTS OF CARBON MONOXID UPON THE EYE.

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WASHINGTON, D. C.

This paper gives a general survey of the subject and includes a graphic description of the subjective and general nutritional effects of carbon monoxid poisoning, by one of the victims; and incidentally throws light on the origin of a story of a haunted house. It gives an account of the ocular symptoms of such poisoning, revealing a distinct tendency of the poison to cause neuritis and especially to affect the optic nerve.

Read by invitation before the Ophthalmic Section of the College of Physicians, Philadelphia, Pa., October 21, 1920. For discussion see p. 127.

The exposure of the human organism to the ravages of carbon monoxid, is a constantly increasing menace in all walks of life. The fact that the details in regard to eye involvements are very meager, despite the voluminous literature upon its general effects, has led the writer to present, in this great ophthalmologic centre, a consideration of the injurious effects of this gas upon certain ocular tissues.

While the ophthalmologist is chiefly interested, clinically speaking, in the chronic form of carbon monoxid poisoning, it will be necessary to consider, in a general way, the universality of this gas; the insidious somatic effects with their sequelae; its combinations in the blood, and the well recognized pathologic changes found in fatal cases, in order that there may be a full appreciation of the action upon the central nervous apparatus and, thru this system, upon the eye itself.

Carbon monoxid has existed in nature, in varying amounts, ever since the first occurrence of the phenomenon of combustion in the presence of a limited amount of oxygen. It formed a part of volcanic gases, and the "Blacksmith Gods" of the old mythology produced it in their forges. In ancient Rome, he who felt that there was "no way except the Bridge of Death" sought its aid in the fumes of charcoal. In modern France, the favorite method of committing suicide is by the inhalation of this gas.

The first production by artificial means was in 1776 when Lassone obtained this gas by heating zinc oxide with carbon.

The gas "is formed wherever combustion of carbon-containing material occurs," tho the proportion of carbon monoxid varies from the almost negligible amount produced by a burning straw to the 30% contained in carburetted water gas. Cogshall estimates that the gasoline torch produces 7% to 10%, while Gardner says that he has found carbon oxid in the vapors of drying paint. According to Apfelbach, the blast in the steel industry produces about 26% of carbon oxid; producer 23%; exhaust from gas engine 9.3%; and he quotes the analyses made by Schumacker of the air of five motor garages in which the average of the five was 0.042%.

Henderson gives the percentage of carbon monoxid in coal gas as 6% to 8%. He also says that carbon monoxid "is the chief constituent of illuminating gas, and to illuminating gas in turn may be traced an unfortunately large number of fatalities in American cities." Seventy-eight per cent of the gas used in the United States is water gas. In a large majority of gas works no attempt is made to remove the carbon monoxid. Ordinarily tests are made for only sulphureted hydrogen.

To these figures must be added the large increase (60% since 1914) in the use of gas for cooking and heating pur-

poses—induced by the great difficulty in getting coal. Apfelbach mentions thirty-one industries in which carbon monoxid poisoning has been observed, and he says in regard to coal gas, producer gas, water gas, furnace gas, etc., "It should be constantly kept in mind that they all contain carbon oxid in varying quantities, and that it has been fairly well established that carbon oxid is the toxic agent in all these cases"; "that the toxicity will vary because of the differences of carbon oxid contents"; and "that gases containing carbon oxid cause more industrial sickness and deaths than the other gases referred to."

In addition to the production of carbonic oxid in buildings, mines, etc., there is a constant pouring out of this gas from the exhaust of automobiles, particularly in the traffic tunnels. Henderson estimates that "there are more than six million automobiles in the United States, not to mention trucks"—all adding their quota to the pollution of the atmosphere. He further states that it is fatal to man to breathe for an hour air that is normal in other respects, but which contains as much as 0.4% of carbon monoxid.

The gas is recognizable by the "lambent blue flame" that appears whenever fresh coal is put upon the cheerful open fire. But by itself, it is colorless, odorless, tasteless, nonirritating, tho none the less persistent and penetrating. The ordinary war gas mask gave no protection against this gas. It was not until 1918 that the discovery of the absorbent qualities of the oxides of various metals, manganese, copper, etc., made possible the protection of persons exposed to the fumes—following mine explosions, etc. From the clinical standpoint, the gas enters the system only by means of respiration, so that unless it is associated with some evil smelling gas, the victims become helpless before its presence is suspected. Fortunately, newspaper accounts of the fatal results of this gas in closed garages, from the instantaneous gas heater (frequently in the bath room) and from the com-

mon stove, help to warn the public of the danger.

While the tragic results of acute carbon monoxid poisoning always arouse much interest, it is a fact that outside of the industrial centres, very little attention has been paid to the headaches, anemia, gastric disturbances and psychic effects that are caused by chronic poisoning by carbon monoxid from the old fashioned latrobes, hot air furnaces, etc. Yarrow says: "I have made a careful investigation of leaky gas fixtures, and have observed that it is the exception rather than the rule to find them perfect in our houses."

McGurn says: "In all probability there is no better known chemical substance, with which a high percentage of our urban and suburban population is brought into such frequent contact, that has attracted so little attention and yet is so capable of inducing such insidious and wide-spread destruction of health as carbon monoxid gas."

In the autumn of 1917, the writer, together with other Army officers, had offices over a garage. Dull headaches, a slight feeling of subnausea, and general listlessness became common occurrences with many of the office personnel as the day advanced; but the symptoms passed away upon getting out into the fresh air. Many aviators complained of nausea following a whiff of the gases from the exhaust of the motor when flying at high altitudes. This is especially apt to occur when the exhaust escape pipe of the motor ends in front of the pilot's seat. The amount of carbon monoxid inhaled at ordinary elevations is negligible, but a very minute quantity of this gas is sufficient to cause symptoms at an elevation of fifteen thousand feet, when the system is already suffering from oxygen want. This gas will also have its influence upon reducing the strength and power of coordination of the ocular muscles which are so important to good flying.

Surgeon General Stokes, U. S. N., found that a great many of the so-called "heat prostrations" in the stoker-rooms are due to carbon monoxid. It is quite possible that this gas is

responsible for the ocular illusions that occur in coal mines. The writer has been told by one experienced in mines that when a miner sees the "old gray mare" he is immediately taken up to the fresh air.

The susceptibility to the toxic influence of this gas varies greatly with individuals and in certain persons there are distinct adaptive changes (as occurs in oxygen want) which enable the individual to further resist the toxic influence. However, it is certain that distinct toxic symptoms will be felt by practically every individual when the percentage of this gas in the atmosphere reaches the point of 0.05%. In cases of "gassing," the subject is rendered unconscious at practically the first inspiration. McGurn says: "It is a fact that repeated inhalations of very minute quantities of carbon monoxid are far more dangerous to the future health of the individual than one exposure where the patient is rendered unconscious."

In chronic cases, where small doses are inhaled intermittently over a long period of time, the more common symptoms are headaches, vertigo, tinnitus aurium, flashes of light before the eyes, weakness or absence of tendon and pupillary reflexes, nausea, pain in the epigastric region, palpitation, languor, muscular weakness and lack of coordination, convulsive movements, mental disturbances, hallucinations of sight and hearing. Anemia is not always present. In fact, there are at certain stages polycythemia.

McGurn says: "On investigation it was found that these gases are capable not only of producing many diseases and conditions peculiar to themselves, but also of simulating nearly every disease known to modern neuro-pathology, as well as many of the so-called 'idiopathic' and 'functional' disorders." Yarrow has pointed out the possibility of confounding chronic carbon monoxid poisoning with various other conditions and intoxications. Among the sequelae of carbon monoxid poisoning are (according to Apfelbach) (1) pneumonia, (2) psychoses, (3) paralyses, (4) skin eruptions, and (5) gan-

rene. But there is no mention of the resulting eye lesions.

In the article upon Toxic Amblyopia in the American Encyclopedia of Ophthalmology, the classification of de Schweinitz is given, which puts carbon monoxid under Group II—"Drugs and chemical compounds which in full or toxic doses depress the cerebro-spinal axis or the peripheral nerves." This paper states that: "Intoxication from poisonous combustion products, especially from carbon monoxid and carbon dioxid, as well as from hydrocarbons and other compounds in illuminating gas, is occasionally accompanied by ocular symptoms."

The following are some of the ocular sequelae of carbon monoxid poisoning that have been noted by different authors: H. Knapp; paralysis of several ocular muscles after exposure to the fumes of a stove. Illing; cases of homonymous hemianopsia. Emmert; case of paralysis of third nerve of left eye, associated with trigeminus and facial paralysis. Becker; cases of retinal hemorrhages and congestion of retinal veins. Henderson says: "In more severe cases the patients recover only with the loss, partial or complete, of vision, power of speech, or with some other nervous defect." Edsall says: "Ocular disorders are not very common; these may be partial or complete blindness of varying duration, with or without ophthalmoscopic changes, xanthopsia, nystagmus, and paralysis of the eye muscles, and there have been repeated instances of complete ophthalmoplegia with marked protrusion of the eyeballs." Apfelbach says: "Rare signs are nystagmus and strabismus...hemorrhages in the sclera and conjunctiva...and diplopia." de Schweinitz quotes Schmitz who describes the following results of carbon oxid: "Contraction of the visual fields, partial color blindness, venous hyperemia in the retina and contracted arteries." Many authors mention inequality of the pupils. McGurn gives a list of 105 varying pathologic conditions known to have been caused by carbon monoxid intoxication. Among them

are the following eye lesions: "Central and marginal scotomata of the optic discs"; "color blindness, transitory"; "diplopia"; "engorgement of retinal vessels"; "impairment of pupillary light reflexes"; "impairment of vision (toxic amblyopia)"; "irregular pupils"; "narrowing of the fields of vision"; "nystagmus"; "edema of optic discs"; "sectional blanching of optic discs"; "optic nerve atrophy (secondary)"; "unequal pupils." Nearly all of these conditions were "seen in cases of multiple sclerosis caused by chronic carbon monoxid inhalation in furnace gas."

There is a wide difference of opinion concerning the state in which carbon monoxid exists in the blood of those poisoned by it, and its mode of action upon the body tissues. Haldane, Henderson and others believe that it "acts as a poison solely by its ability to prevent the normal supply of oxygen from reaching the tissues, and thereby the normal metabolism of the body cells." Henderson says: "It resembles oxygen but the avidity with which it combines with hemoglobin is three hundred times greater than oxygen. It kills because it reduces the oxygen-carrying power of the blood and not because it forms a permanent compound with hemoglobin." He believes that access to fresh air causes a speedy disassociation of the carbon compound. On the other hand, many close observers feel that the compound is stable and that it has a direct action upon the delicate nerve structure of the body. Yarrow says: "Carbon monoxid, as is well known, forms a very stable combination (chemic) with hemoglobin, so that blood once impregnated with the deadly gas loses its power as an oxygen carrier to the tissues of the body." According to Rand, "If a considerable portion of the blood becomes saturated with this gas death is inevitable not by suffocation, as commonly imagined, but by carbon monoxid poisoning." McGurn says: "The writer wishes to express the opinion that CO is a chemical substance capable of a peculiar, selective affinity; that enters into a more or less fixed combination

with the hemoglobin of undiluted blood and yet possesses a stronger avidity for certain nerve elements that are not found in other structures of the body; also that when carbon monoxid pervades the general circulation, it is slowly liberated from its hemoglobin combination and reabsorbed by receptive brain and nerve tissues so that irritative and permanent degenerative changes often result; and that when such irritations and degenerations of the central or peripheral nervous systems are once established, an infinitely small quantity of this gas (one to two hundred thousand) is capable of aggravating and hastening the retrogressive changes which it has already produced." Apfelbach says: "The CO rapidly united with the hemoglobin, replacing the oxygen and forming a very stable compound known as carboxy-hemoglobin."

Whatever the difference of opinion concerning the mode of action of this poison upon the central organs, all are agreed upon the very definite lesions that have been observed in fatal cases. Munroe says: "The effect is to produce intense congestion of vital organs, especially in the brain, usually accompanied by small hemorrhages." Apfelbach says: CO causes a rapid degeneration of various organs. Autopsy on cases from psychoses of CO gas shows a predilection for degenerations, thrombosis, encephalitis in the lenticular nucleus and optic thalamus. It is held that the encephalitis and hemorrhages, sometimes observed in gas autopsies, are due to the rapid fatty degeneration which occurs in the vessel walls." Concerning the changes in the nervous system in these cases, in addition to conditions already mentioned, Brown states that there were "hemorrhages in the pia of the brain and cord, bloodless patches with softening in the cord and fatty degeneration of the endothelium of the small vessels of the central nervous system, chromatolytic and atrophic changes in the large motor cells of the cord." He assumes "an interference with the nutrition of the neurons which regulate the function of the nerves."

CASES

The following instance of the chronic carbon monoxid poisoning of an entire family is given in detail from the account that Mrs. H. wrote while the occurrences were fresh in her mind. This recital is of interest because it gives a very intelligent account of the physical and psychic effects of the gas, and also because the writer has been able to follow the case of one of the children, B., who as a result of this poisoning has suffered from the long continued effects of an optic neuritis.

"Near the end of October, 1912, our town house was burned. Therefore it became necessary for us to hire a furnished house for the winter. As it was November, most of the desirable ones were taken, and we had great difficulty in finding one with a sufficient number of bedrooms. Finally we succeeded in finding one vacant.

It was a large, rambling, high-studded house, built about 1870, and much out of repair. It had not been occupied by the owners for the past ten years, tho occasionally it had been rented for the winter. The house was situated on a sunny street, and altho the sun bathed the outside of the house, it rarely seemed to penetrate thru the tall and narrow windows. All the floors and stairways were heavily carpeted. Absolute silence reigned thru the house, not a foot-fall could be heard. There was no electricity, the house being lighted thruout by gas.

On November 15th we moved into the house. The children were not to come for a couple of days, until we had become somewhat settled. The second day we were in the house the furnace broke down, and new parts had to be made in Syracuse. It was a very old furnace, built thirty years or more ago, a combination of hot air and steam, with a boiler suspended over the fire. While waiting for the new boiler to be made, only part of the furnace could be used, not enough to heat the whole house, so we decided to have the children stay away for ten days longer.

G. and I had not been in the house more than a couple of days when we felt very depressed. The house was over-

poweringly quiet. The servants walked about on thickly carpeted floors so quietly that I could not even hear them at their work.

One morning I heard footsteps in the room over my head. I hurried up the stairs. To my surprise the room was empty. I passed into the next room, and then into all the rooms on that floor, and then to the floor above, to find that I was the only person in that part of the house

After November 25th the furnace was temporarily repaired and we sent for the children. We felt more cheerful after they arrived, the house seemed less big and solitary. Many mornings, when going down stairs or thru the halls, I would notice an odor of gas. Upon investigating the different gas fixtures I would find them in proper condition.

I had not been in the house more than a couple of weeks when I began to have severe headaches and to feel weak and tired. I took iron pills three times a day and spent a couple of hours each afternoon in my room, lying down and resting, a rather discouraging process, as after resting my headache was always worse than it had been before.

It had always been G.'s habit at night before going to bed, to sit in the dining-room and eat some fruit. In this house when seated at night at the table with his back to the hall, he invariably felt as if someone was behind him, watching him. He therefore turned his chair, to be able to watch what was going on in the hall.

The children grew pale and listless and lost their appetites. The playroom at the top of the house they deserted. In spite of their rockinghorse and toys being there, they begged to be allowed to play and have their lessons in their bedroom.

I grew more tired and indifferent to everything, and also felt very cold in the evenings, and wore shawls and scarfs most of the time. The children seemed so poorly and I was so tired, I took them away the day after Christmas, for the holidays.

While we were away, G. was frequently disturbed at night. Several times he was awakened by a bell ringing, but on going to the front and back doors, he could find no one at either. Also several times he was awakened by what he

thought was the telephone bell. One night he was roused by hearing the fire department dashing up the street and coming to a stop nearby. He hurried to the window, and found the street quiet and deserted.

Soon after the New Year, the children

replied; but as I grew more wide awake I realized that it could not be any one of the doors of the room as they were tightly closed. Another time, a little before daylight, I was awakened by heavy footsteps going down a staircase behind the wall at the head of my bed. Then a

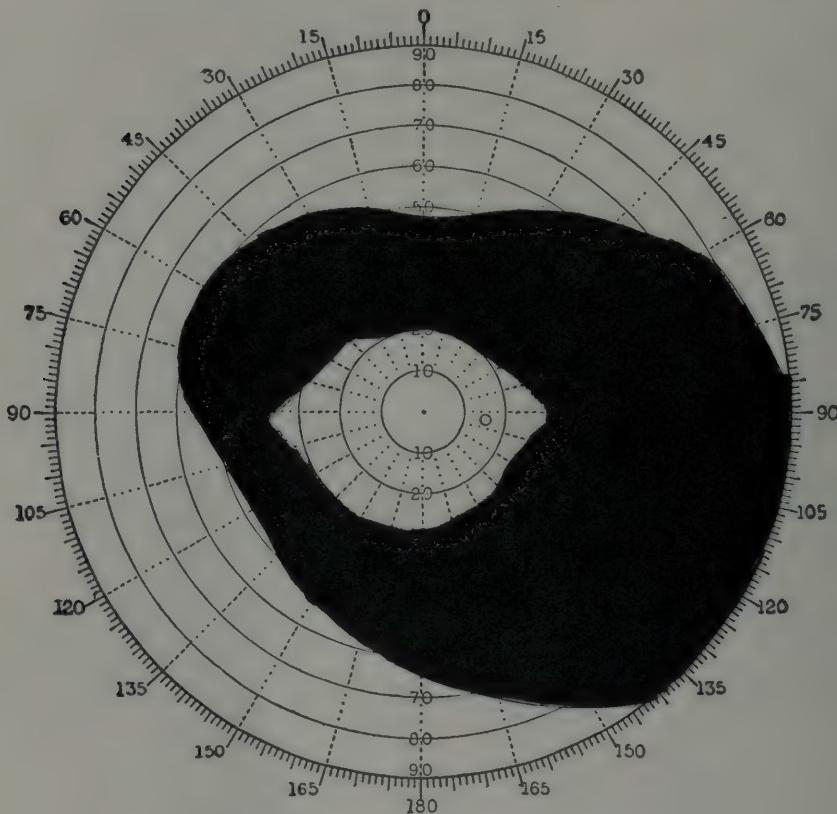


Fig. 1.—Form field of right eye, 1917, Jan. 5. Case 1.

and I, with the nurses, returned to the house. We all felt better for our change and returned quite glad to settle down again. Soon, however, the gloom of the house began to cast a shadow over us once more. The children grew paler and had heavy colds. When out of doors their colds grew less and they seemed better. My headaches returned, and I frequently felt as if a string had been tied tightly around my left arm. One night I was awakened by a heavy door slamming once, quite near me. It woke G., too, and he said to me, "What was that?" "Only the door of the room," I

number of crashes down stairs, as if several pots and pans had been hit together or against the kitchen stove. Soon I realized that there was no staircase behind the wall, only the thickly carpeted front stairs on which no footsteps could be heard. Also that it would be impossible, in my room, to hear any sounds from the kitchen, no matter how loud.

On one occasion, in the middle of the morning, as I passed from the drawing-room into the dining-room, I was surprised to see at the further end of the dining-room, coming towards me, a strange woman, dark haired and dressed

in black. As I walked steadily on into the dining-room to meet her, she disappeared, and in her place I saw a reflection of myself in the mirror, dressed in a light silk waist. I laughed at myself, and wondered how the lights and mirrors could have played me such a trick. This

And so on he talked, insisting that he had been called, and for me to explain who it had been.

The days went on, and the children grew paler and more listless. Some days, as their colds seemed worse, I kept them in bed. Then again, as there did not

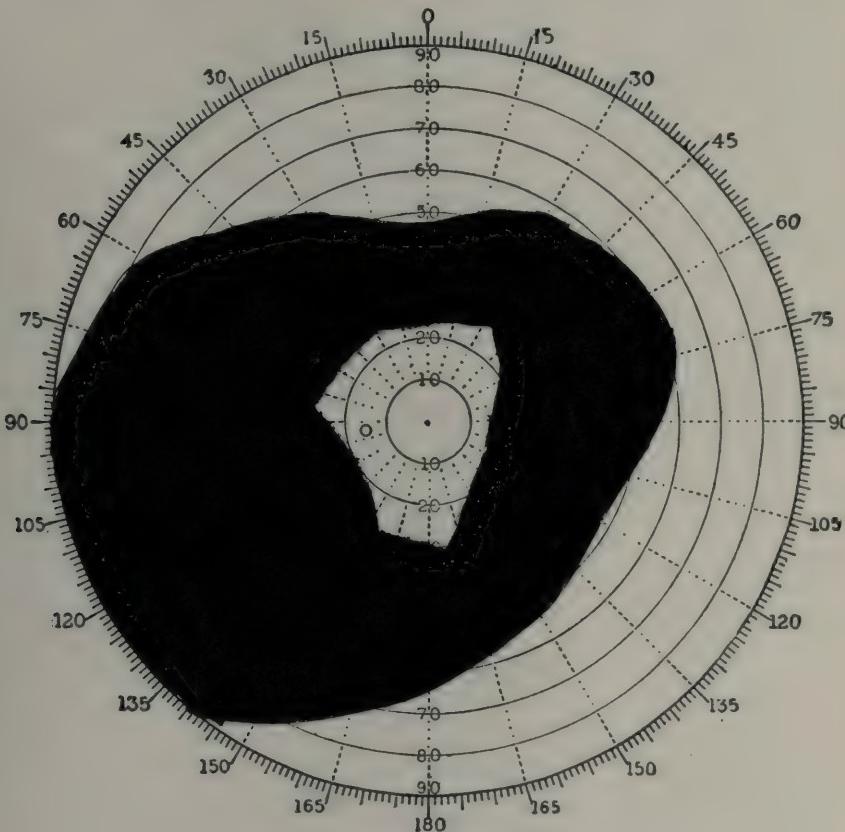


Fig. 2.—Form field of left eye, 1917, Jan. 5. Case 1.

happened three different times, always with the same surprise to me and the same relief when the vision turned into myself.

As I was dressing for breakfast one morning B. (four years old) came to my room and asked me why I had called him. I told him that I had not called him; that I had not been in his room. With big and startled eyes, he said, "Who was it then, that called me? Who made that pounding noise?" I told him it was undoubtedly the wind rattling his window. "No," he said, "it was not that, it was somebody that called me. Who was it?"

seem to be very much the matter with them and they appeared to be growing too fond of staying in bed, I made them get up and go for a walk in the sun. It was very hard to make them eat. B. would play vigorously for a little while, and then would lie, stretched out, limp and listless upon the floor, a toy in front of him clasped in his hand, his eyes glued upon it and yet apparently neither seeing nor thinking about it. About half an hour later, perhaps, he would suddenly get up and play again.

About this time my plants died. Some of them I had had for a number of years.

At this time I had a cold and cough, and ached all over as if I were going to have an attack of grip, but as I had no fever, I went about as usual. G. was not feeling at all well either. He had a great deal of pain at the back of his head and felt as if he was going to have ty-

but as everything was quiet he instantly dismissed that idea. It then flashed across his mind that I had been playing a joke on him, but upon looking at me, he saw that I was in a heavy sleep, very much as if I had been drugged. Until we lived in this house, I had always been

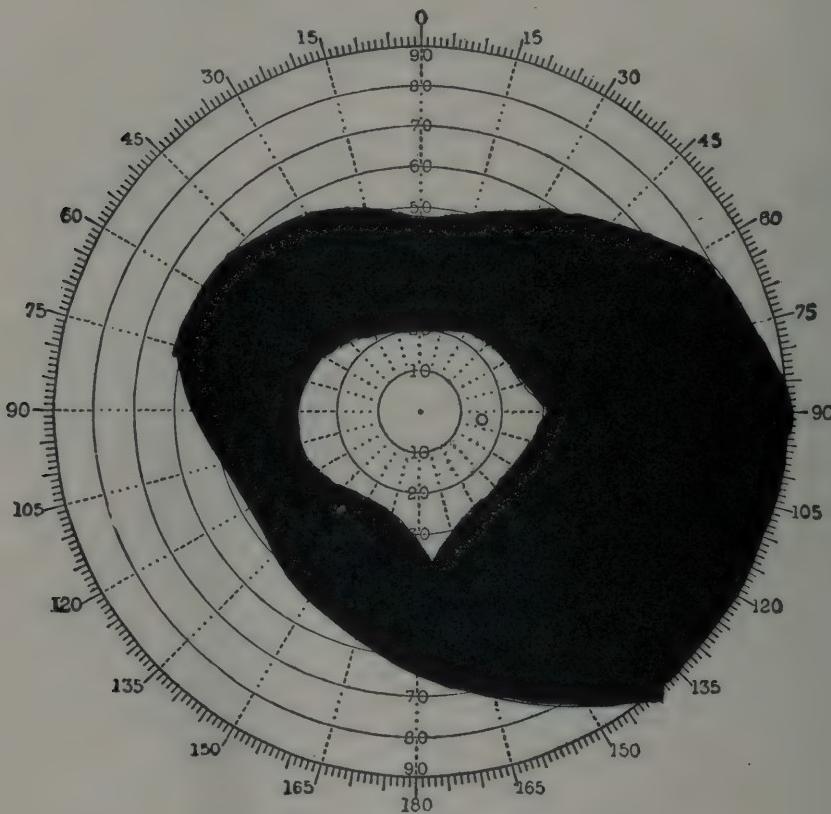


Fig. 3.—Case 1. Form field R. E., 1917, April 21.

phoid fever for a second time. The servants, too, had grown pale, and moved about the house listlessly.

On the night of January 15 we went to the opera. That night I had vague and strange dreams, which appeared to last for hours. When the morning came, I felt too tired and ill to get up. G. told me that in the middle of the night he woke up, feeling as if someone had grabbed him by the throat and was trying to strangle him. He sat up in bed and had a violent fit of coughing, which lasted about five minutes. His first thought had been that burglars were in the house,

a light sleeper, waking at the slightest sound. In this house, however, nothing seemed to wake or disturb me. Quite the contrary with G., for in the past he had always slept heavily, never hearing a sound and nothing disturbed him. Now he was continually waking, answering the telephone and doorbell, which had never rung, and looking for burglars, who never materialized.

That morning after breakfast, as was my usual custom, I sent for the children's nurse, a Scotch woman who had lived with me for several years. She looked worn and pale, and when I asked how

the children had slept she burst out with, "It has been a most terrible night. This house is haunted."

I laughingly told her that that was the most ridiculous thing I had ever heard.

"I would have said the same thing three months ago," she answered, "but

fat man touch me.' He was terrified. It took Fräulein and me until ten o'clock to calm him. He slept the rest of the night with me, in my room. Fräulein slept in B.'s bed, beside G. Jr., to protect him. G. Jr. did not wake up all night, but the muscles of his face kept twitch-

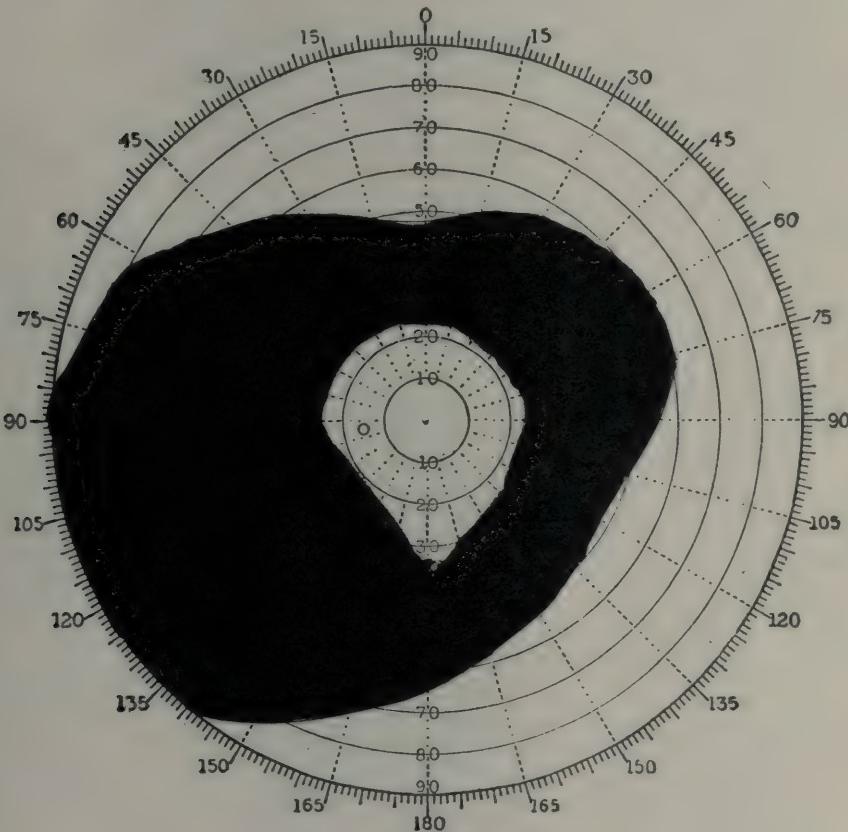


Fig. 4.—Case 1. Form field L. E., 1917, April 21.

I have had such experiences that I am now convinced of it, and everyone in the house has had experiences too." She said that after being in the house two or three days, things had begun to happen. She had not told me before, as she and the rest of the household had made up their minds that I ought not to be disturbed about it. "But last night," she continued, "when the children were attacked, it became my duty to let you know at once. While you were at the opera," she went on, "about half past eight, B. woke up and ran screaming thru the hall to my room, 'Don't let that big

ing, as if someone was continually pinching him. In the morning when he woke, he said indignantly to Fräulein, 'Why have you been sitting on top of me,' and when she told him that she had not been sitting upon him, but had been in the bed next to him, he said, 'No, you have been sitting on top of me, and you were awfully heavy, too.'

"Often in the evening, after the children have gone to bed, never until after dark and the lights are lighted, Fräulein and I may be laughing and talking, when all of a sudden we hear the heavy tread of an old man walking slowly and stead-

ily along the hall on the floor above us. It has not been one of the servants, for I have often run up stairs to see, and I have found the whole upper story of the house in darkness, and empty. Sometimes as I walk along the hall I feel as if someone was following me, going to

Sometimes, after I have gone to bed, the noises from the storeroom are tremendous. It does not happen every night; perhaps a week or ten days will pass, and then again it may be several nights in succession. Sometimes it sounds as if furniture was being piled against

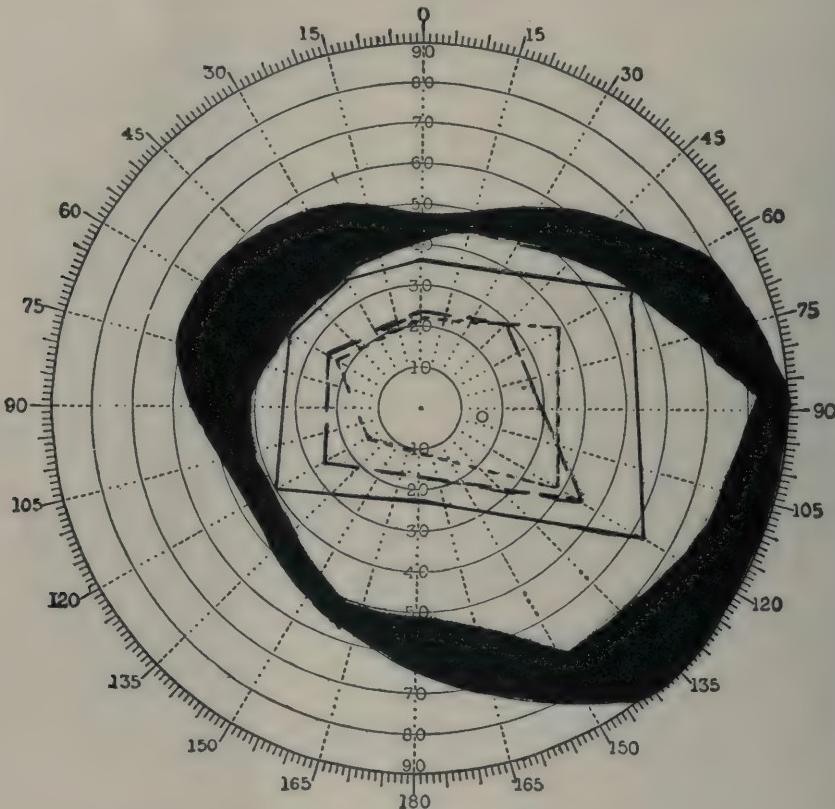


Fig. 5.—Case 1. Right fields, 1919, May 28. Form field, inner edge of black. Field for blue, continuous line. Field for red, line of long dashes. Field for green, short dashes.

touch me. You cannot understand it if you have not experienced it, but it is real. Some nights after I have been in bed for a while, I have felt as if the bed clothes were jerked off me, and I have also felt as if I had been struck on the shoulder. One night I woke up and saw sitting on the foot of my bed a man and a woman. The woman was young, dark and slight, and wore a large picture hat. The man was older, smooth shaven and a little bald. I was paralyzed and could not move, when suddenly I felt a tap on my shoulder and I was able to sit up, and the man and the woman faded away.

the door, as if china was being moved about, and occasionally a long and fearful sigh or wail."

The governess, Fräulein Y., then came to me. She also spoke of the heavy footsteps at night—like an old man in overshoes walking slowly along. She also heard the noise in the store-room, the moving and piling up of furniture. She slept in a big, four-post bed, with a canopy. One night, after she had been in bed a little while, she felt the bed shaken, and the canopy swayed. Thinking that a draught from the open windows might be causing the sensation, she

got up and closed them. She returned to bed, and after a short time the shaking of the bed was repeated. Again she got up, examined the room thoroly, but was unable to unearth anything.

I interviewed all the servants in turn. They all had heard at some time or other,

tales, we nevertheless felt as if there was a serious aspect to it. Why had all the servants whom we had had for several years, gone practically mad all of a sudden? We began to trace back the history of the house. The last occupants we found had exactly the same experiences

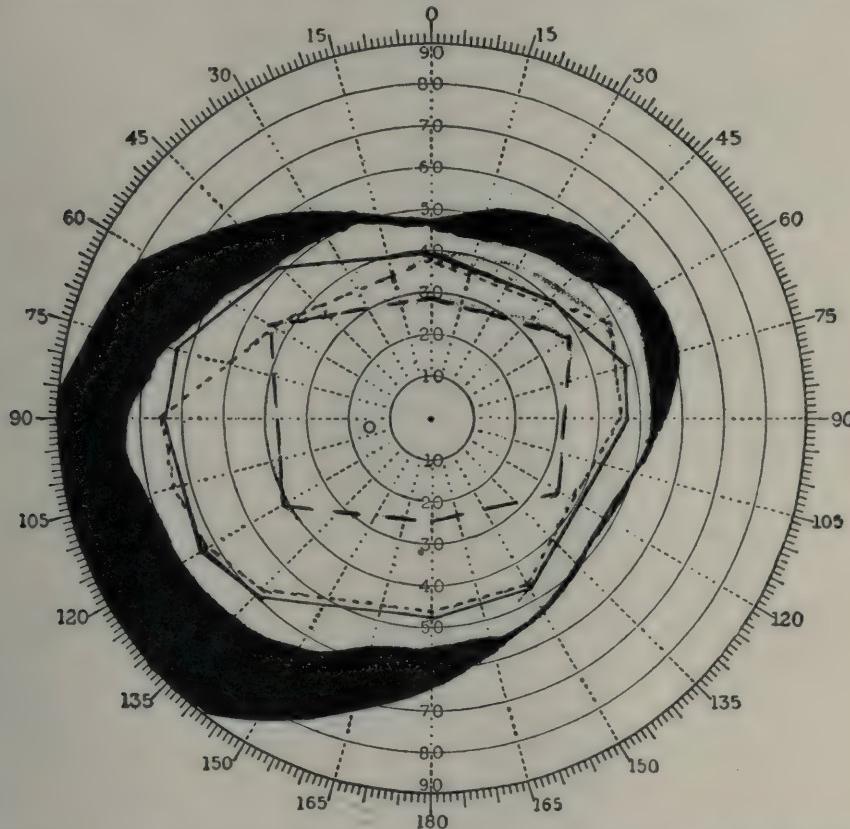


Fig. 6.—Case 1. Left fields, 1919, May 28. Form field, inner edge of black. Field for blue, continuous line. Field for red, line of long dashes. Field for green, short dashes.

the footsteps at night going slowly along the corridor outside of their rooms. Each one at first had thought it one of the others, and was surprised, after inquiring, to find none of them about. They all spoke of strange experiences after they had gone to bed; as if something crept around the bed and then over them, and then they were unable to move. Sometimes it lasted for a long time, sometimes shorter. Not every night, but perhaps every second or third night. It never happened to them all on the same night, but to one and then to another.

Much amused as we were by all these

as ourselves, with the exception that they stated that some of them had seen creeping around their beds visions clad in purple and white. Going back still further, we learned that almost everyone had felt ill and had been under the doctor's care, altho nothing very definite had been found the matter with them.

Saturday morning, the eighteenth of January, G.'s brother told us that he thought we were all being poisoned; that several years before he had read an article which told how a whole family had been poisoned by water-gas and had had the most curious delusions and experi-

ences. He advised us to see Professor S. at once. As he was out of town, his assistant, Mr. S., came at once to our house. We told him how listless and ill the children appeared. He found one of them lying on the floor, and the other two in bed. We related the experiences of

poisoned. He instantly ordered iron for them, and for the whole household. He also stated that none of us ought to stay in the house another night."

On January 5, 1917, when B. was eight years old (four years after he had been taken from the poisoned house), the

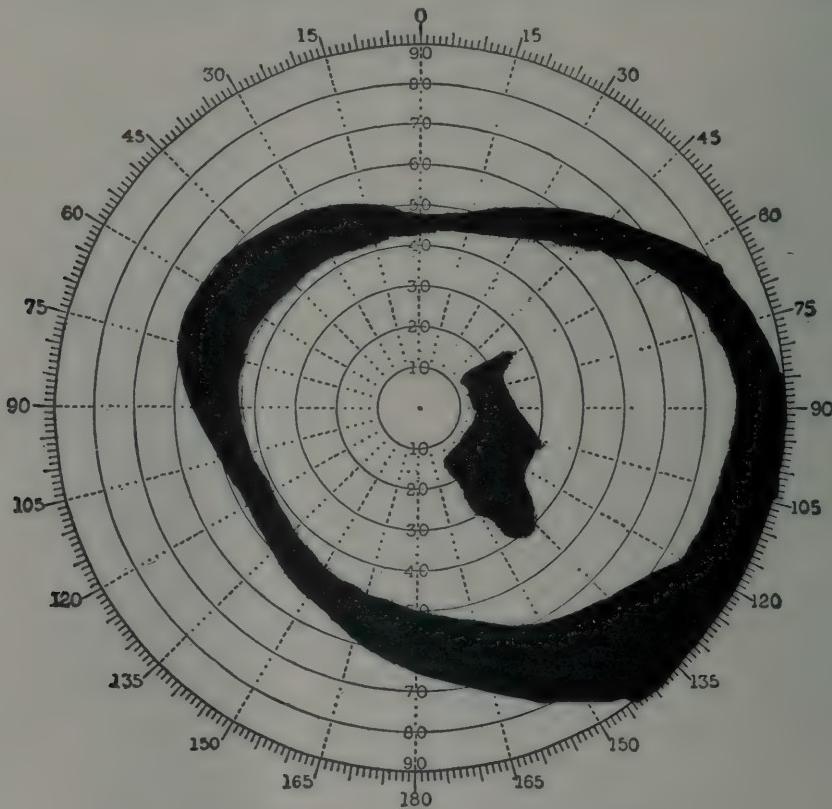


Fig. 7.—Case 1. R., 1920, March 22. Showing paracentral scotoma.

the children and servants, and told him about the plants. He examined the house thoroly from top to bottom and interviewed the servants. He found the furnace in a very bad condition, the combustion being imperfect, the fumes, instead of going up the chimney, were pouring gases of carbon monoxid into our rooms. He advised us not to let the children sleep in the house another night. If they did, he said we might find in the morning that some one of them would never wake again.

Early in the afternoon our physician arrived and examined the children and agreed with Mr. S. that they were being

writer examined the boy's eyes. His mother stated that of all the family he was the only one who seemed to have persistent symptoms following his exposure to the carbon monoxid fumes. In his case there had been some gastric disturbance and anemia. In addition, he did not do well in reading—miscalling letters—altho he was a very clever boy. His adenoids had been removed when he was three years old. Two operations on his tonsils had resulted in their removal. Tho he experienced numerous colds there had never been any recognizable sinus trouble. "About two years previously his eyes had been examined by Doc-

tor Proctor who had found a contraction of the visual fields." (In a recent personal communication Doctor Proctor says, at that time he had in mind hysteria as a cause of the eye trouble.)

Present condition: Externally the eyes were normal, pupillary reactions normal,

reexamined. At that time, his general physical condition was reported much better. R.E.V. = 20/40 with cyl. -0.50 at 45° = 20/30+. L.E.V. = 20/30; with cyl. -0.50 at 135° = 20/20+. Color vision still normal. Light sense seemingly a trifle diminished. Visual

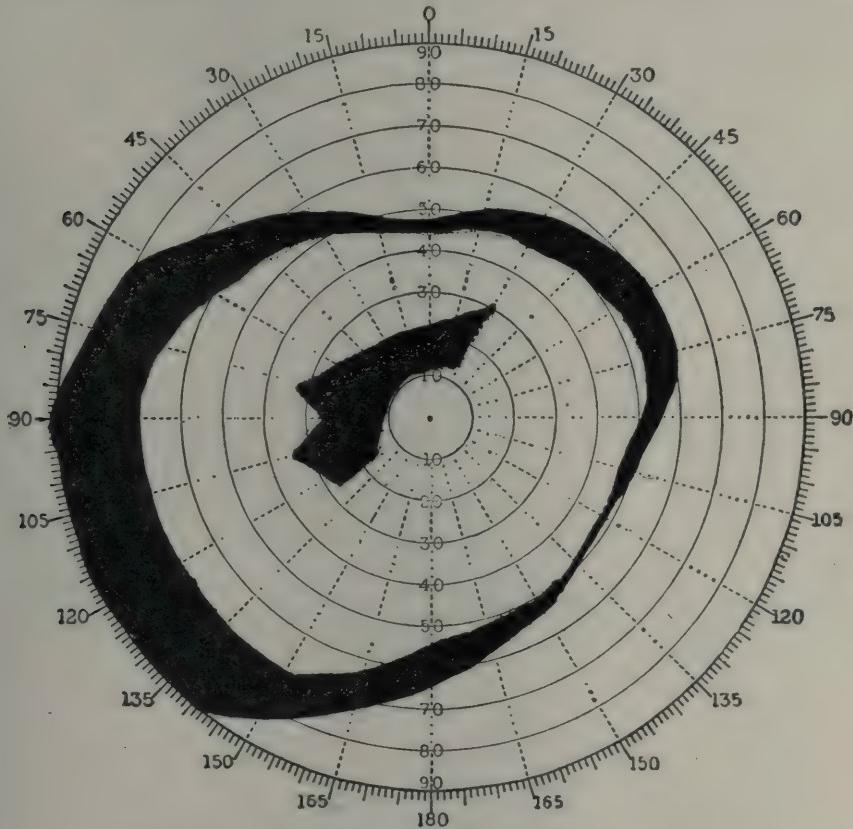


Fig. 8.—Case 1. 1920, March 22. L., showing paracentral scotoma.

motility and muscle balance good. The central vision was 20/20+ in each eye, accepting a cyl. +0.25 at 135° in the right and the same cylinder at 45° in the left eye. Visual fields much contracted (Figs. 1, 2). The fundus of each eye was practically normal. The discs, if departing at all from the normal, were a trifle hyperemic. The central color vision was very acute. On April 21, 1917, the patient's eyes were again examined. The tests were practically as at the last examination, three months and a half previous (Figs. 3 and 4).

On May 28, 1919, after a lapse of a little more than two years, his eyes were

fields improved (Figs. 5 and 6 fields for form and colors).

On March 22, 1920, B. was again presented for examination. Mrs. H. reported that for the last month his sight had seemed more normal. He had become very fond of reading and voluntarily read a great deal. The central vision and color sense were unchanged since the last examination in May, 1919. The visual fields were much enlarged but there was a marked paracentral scotoma in each eye. Blind spots enlarged. (Figs. 7 and 8 show form fields with paracentral scotomas. Figs. 9 and 10 show enlarged blind spots.)

The patient when first seen by the writer seemed to be recovering from an interstitial inflammation of both optic nerves of the type described as perineuritis by Peter and others. As the ophthalmoscopic changes were negligible, the diagnosis had to depend upon the history of the case and upon the visual

used alcohol in moderation and smoked from ten to fifteen cigarettes a day. About May 1, 1920, used a gasoline torch in a closed room, to remove paint from a mantel piece. For about two hours afterwards felt very faint, dizzy and nauseated; did not vomit; had headache; and could not continue the work. These symptoms disappeared in a short time. But two days later, vision became very blurred. This seemed to disappear after lasting two days. On July 1st, he used the torch in the same way in the same room all day and half of the next day; had to stop work several times owing to

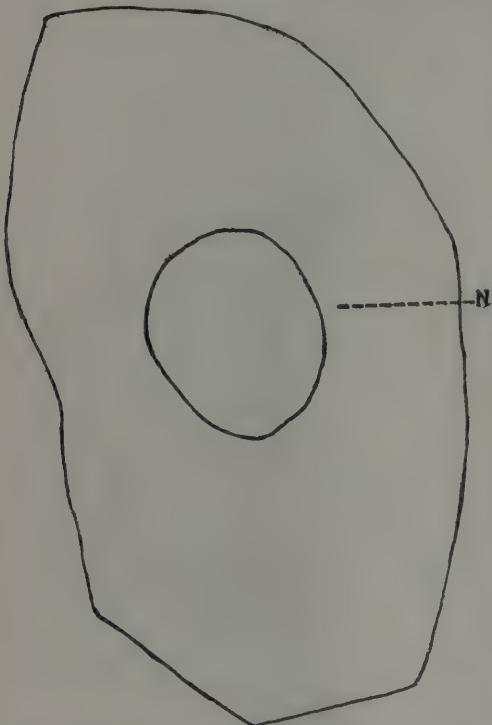


Fig. 9.—Case 1. March 22, 1920, showing enlargement of blind spot Right N. outline for normal blind spot.

fields. Nothing apart from the exposure to a poisonous gas could be found bearing a causal relation to the ocular disturbance. On October 1st of this year, Mrs. H. wrote concerning the lad: "He has developed a great taste for drawing and painting. I am sending a few samples of them, thinking they might interest you in regard to the development of his eyes."

The writer is indebted to Dr. J. W. Burke for the notes of the following case. The patient was first seen on September 11, 1920. J. E. B., 35 years of age, well nourished; never had a serious illness; family history good; habits good;

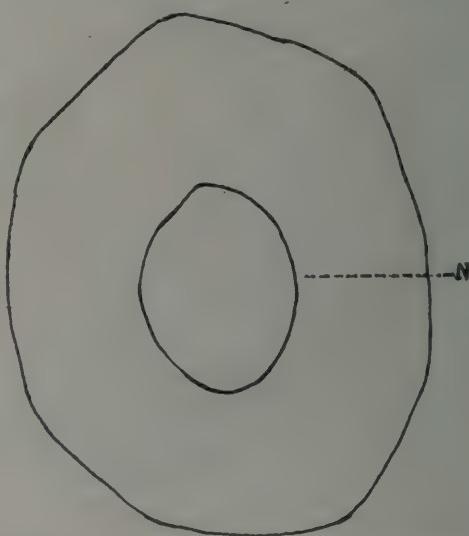


Fig. 10.—Case 1. March 22, 1920, showing enlargement of blind spot in Left. N. outline for normal blind spot.

a recurrence of the symptoms experienced in May. Two days later, the vision again became impaired, and it grew steadily worse for ten days. But since that time, there has been practically no further change in the vision. Patient was carefully questioned about the possibility of having used wood alcohol, quinin, or other toxic substances; but no evidence in regard to such use could be elicited. Had seen several oculists who had pronounced his trouble optic atrophy. R.E.V. = 13/200; L.E.V. = 20/200. Jaeger 14 with difficulty. R.E. pupil 3½ mm. and L.E. 4½ mm. in diameter; reactions present but sluggish. Color sense

very defective. Fields contracted (Fig. 5).

Patient was treated by subconjunctival injections of normal salt solution and increasing doses of strychnin. While under observation, the central vision remained practically the same, tho later, on September 21, there was a slight improvement in the visual fields (Fig. 12).

The neurologic report stated that, apart from the eye condition, there was

additional cause of eye lesions. As carbon monoxide is present in all of the gases connected with domestic and industrial activities, it has possibly been responsible for certain obscure amblyopias that have been attributed to other often quoted chemical substances. And its causal relation may be obscured at times by some other very evident source of toxemia, such as septic tonsils, apical abscesses, syphilis, etc.

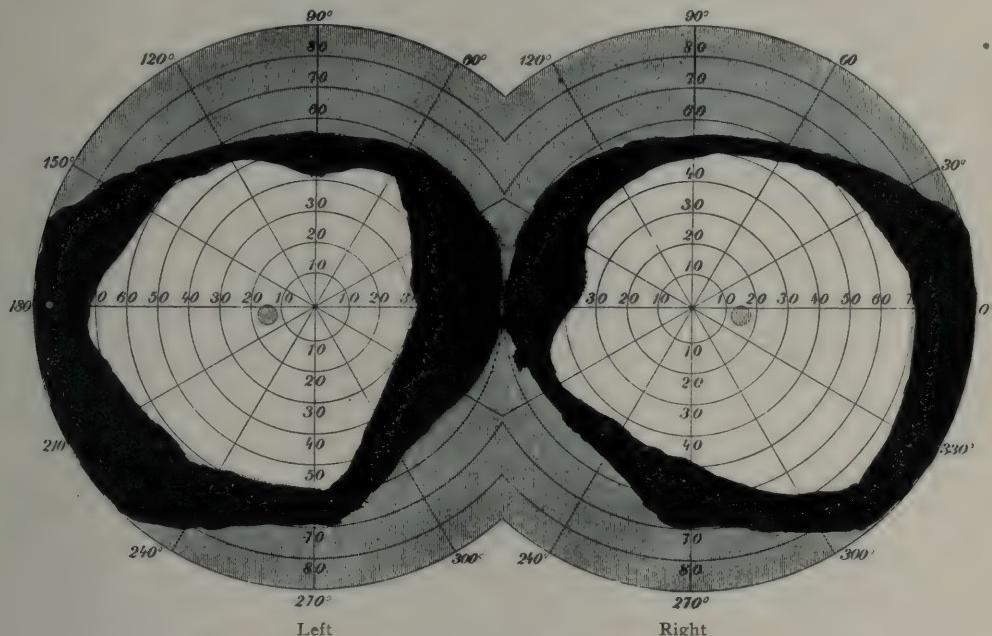


Fig. 11.—Case 2. Form-fields, 1920, Sept. 11.

no evidence of an organic lesion of the central nervous system. There was, however, an absence of the achilles reflex as well as a distinct difference between the knee kick and the tendon reflexes of the upper extremities. The examination of the cerebrospinal fluid showed that the Wassermann reaction was negative, but that the protein content had been increased, and there were 20 cells per cu. mm. Examination of the blood negative in all particulars. X-ray of sinuses and sella turcica negative. Examination of feces negative. All other examinations made to discover a possible source of toxemia, were negative.

The exposure in modern life to the influence of carbon monoxid, introduces an

It is not of vital importance to the ophthalmologist whether carbon monoxid manifests its serious effects as a distinct chemic poison, or whether it deals destruction purely by its power of quickly depriving the blood of its essential oxygen-carrying power. But it seems to the writer, after much experience with pure oxygen want, artificially produced, that there is much truth in the two opposing theories. On the one hand, the physiologist sees the dramatic effect of carbon monoxid upon the person who takes one whiff of the concentrated gas and falls as if electrocuted; or he is interested in those cases which finally become unconscious after a longer exposure to fumes of lesser strength. Moreover, he

sees the results of experimentation in the laboratory, and he is quite rightly impressed by the effect of this gas upon the oxygenation of the blood. But he does not come in contact with the final consequences of the prolonged, but intermittent, exposures to infinitesimal doses of this gas—results which are of such interest to the clinician. In these cases, the symptoms run the gamut of clinical medicine.

etc. The ocular nerve lesions seem to be due to changes in the delicate structures of the nuclei of origin of these nerves.

However, thru its effect upon the sensitive fabric of the central nervous system, carbon monoxid does cause ocular paralyses, hemianopsias, disturbances of normal pupillary reactions, optic neuritis, and, actually, optic atrophy. Like pure asphyxiation, it is the source of great ocular congestion, and in this way it does

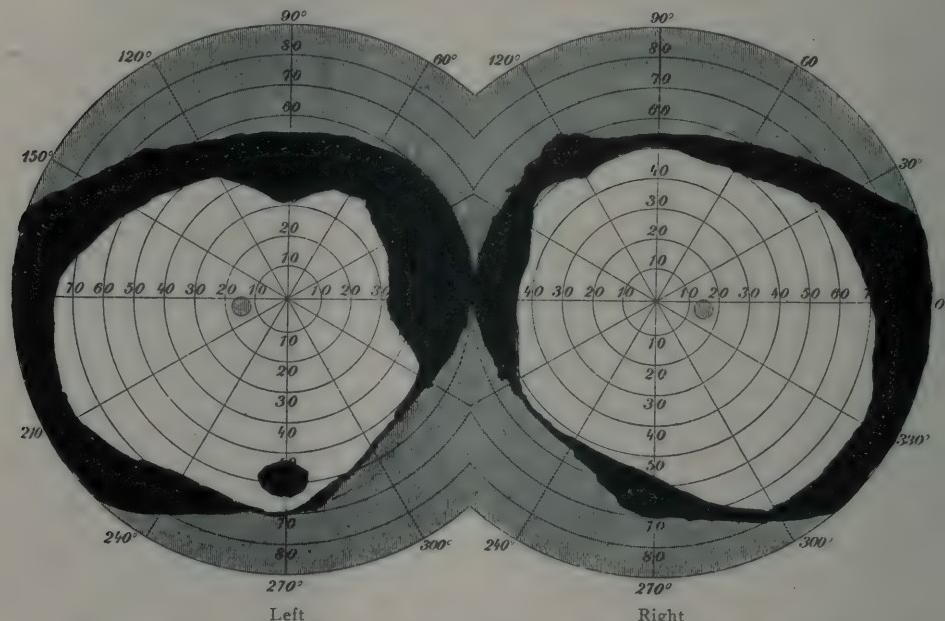


Fig. 12.—Case 2. Form fields, 1920, Sept. 21, showing some enlargement with scotoma in left.

The history of carbon monoxid convinces one that, apart from the effect upon the hemoglobin, it is chemically inert compared with the toxicity of other well-known chemic substances. However, one cannot but feel that after a prolonged attack upon the body tissues, it exerts a deleterious influence which is apart from its purely oxygen-depletion effect—tho the latter does sensitize the delicate structure of the central nervous system.

Carbon monoxid does not show any great predilection for exhibiting its toxic influence upon the optic nerve fibres as a whole, nor even upon the very sensitive papillo-macular bundle which is so markedly affected by alcohol, nicotine,

cause subconjunctival and retinal hemorrhages; while in the milder cases of carbon monoxid poisoning congestion of the respective cerebral centres causes hallucinations of vision, hearing and touch.

The writer feels that the first case reported is one of optic neuritis due entirely to carbon monoxid poisoning. This seems to be a logical conclusion to draw from the history of the case, the great general disturbance, the very slow recovery, the elimination of every other toxic source, and the recognized susceptibility of children to this gas.

In the second case, carbon monoxid is the probable cause of the optic atrophy, by reason of the very clear history of

ocular and other disturbances that followed each exposure to its fumes, and the exclusion of all other toxic sources.

The treatment seems to resolve itself into remedies suggested by the symp-

toms, prophylaxis, hygiene, and the legislation that should follow the proper education of the public in regard to the insidious toxicity of this "Frankenstein" of advanced civilization.

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(1) EPIBULBAR CARCINOMA NINE YEARS AFTER REMOVAL OF A PAPILLOMA OF THE CORNEOSCLERAL MARGIN; (2) SMALL, SPINDLE-CELLED HEMANGIOSARCOMA OF THE EYELID OF A CHILD AGED FIVE MONTHS, EXCISION FOLLOWED BY RADIUM TREATMENT; (3) PATHOLOGIC HISTOLOGY OF A CONCUSSIONED EYE FOLLOWING GUN-SHOT WOUND OF ORBIT.

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PHILADELPHIA.

This paper reports especially the significant microscopic findings throwing light on the pathologic history of these cases. It was read at the meeting of the American Ophthalmological Society, June, 1920.

The object of this communication is to present the clinical histories of the cases described in the title, as well as the pathologic examinations of the specimens, without analysis of the literature, or reference to similar lesions and growths, except in incidental mention.

CASE I. *Epibulbar Carcinoma.* J. R., laborer, male, white, aged eighty, was admitted to the Eye Ward of the University Hospital December 2, 1919, for the treatment of an epibulbar growth of the left eye of large size.

Medical and Family History: Except for repeated attacks of rheumatism, one attack six years ago being especially severe, the patient's medical history is unimportant. The causes of the death of his father and mother are unknown; his wife died of tuberculosis; there is no family history of carcinoma.

Eye History and Examinations: In October, 1910, or nine years prior to his second admission to the hospital, he had applied for treatment of a small tumor at the corneoscleral junction.

The uncorrected vision of the right eye at this time was 6/22, and it revealed no pathologic condition. The uncorrected vision of the left eye was 6/45. The growth referred to, somewhat crescentic in shape, was situated along the inner border of the corneo-scleral junction, and extended from the center of the upper corneal border around its inner margin to the center of its lower border. Directly in its middle, on a line with the internal rectus, the growth was depressed, owing to the presence of a small pterygium. It appeared to arise in two portions above and below it. The

neoplasm was attached by a broad base, which encroached for 4 mm. on the corneal surface and about 6 mm. on the bulbar conjunctiva. It was smooth on its surface, and of a reddish-yellow color; a number of injected conjunctival vessels surrounded its margins (Fig. 1).

The patient maintained with positiveness that the growth had begun to appear after his eye had been injured by coming in contact with the fin of a sunfish, which struck him violently in the corner of the eye, and occasioned primarily a stubborn traumatic conjunctivitis. Exactly how long a time elapsed between the date of the injury and the development of the tumor as it appeared at the time of examination is not known. According to the patient's statements, it was between three and five years. The tumor was excised, and the gap produced by the dissection covered with conjunctival flaps. Healing was uneventful, and the patient left the hospital at the end of a week.

To the microscope the growth revealed the following characteristics: Externally there was a layer of stratified squamous epithelium arranged in a papilliform manner, while between the papillae there was a rather dense connective tissue growth. This layer of epithelium surrounded an area consisting for the greater part of dilated capillaries and arterioles filled with blood-cells. The remainder of the growth was composed of myxomatous and connective tissue. The epithelial elements were in no sense infiltrated, and had a definite relation to the basement membrane. Many of the cells showed distinct chro-

matin filaments in their nuclei, and in one spot there was an appearance suggesting pearly body formation.

Physical Examination: At the time of the patient's second admission to the hospital (December 2, 1919), nine years after the removal of the epibulbar papilloma which has been described, the

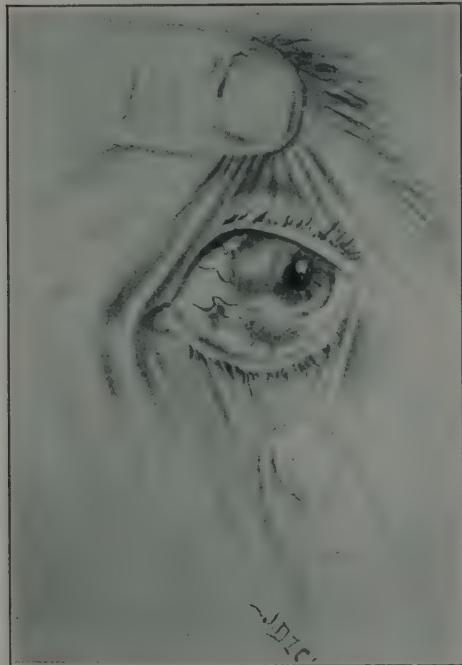


Fig. 1.—Papilloma of the corneo-scleral border, followed nine years after its removal by an epibulbar carcinoma.

physical examination revealed the following conditions: Lungs negative; heart slightly enlarged to the left, with weak muscle sounds and a loud systolic murmur over the aorta and at the mitral area; rhythm good, and no evidence of decompensation; no dyspnea or edema.

The urine was without sediment, free from albumin and sugar, and contained neither casts, cylindroids, nor crystals. Blood count: Erythrocytes, 3,820,000; leukocytes, 6,000; hemoglobin, 70 per cent. Blood pressure, systolic, 155; diastolic, 95.

Eye Examinations: R. E.: Negative except for a few striæ in the lens. L. E.: Protruding between the lids there was a

large, fungus-looking mass, approximately 2 cm. in height, arising from the upper corneo-scleral region, overhanging and partly adherent to the cornea in front, and extending backward along the scleral expanse for 2 or 3 cm., and apparently involving the tissues more posteriorly in the orbital cavity. The fundus could not be seen, owing to the haziness of the uncovered part of the cornea. The growth bled easily, was of a dirty grayish color, and the patient suffered considerable pain deep in the orbit and in the periorbital region.

Operation: Removal of the eyeball, and, if necessary, removal of the orbital contents, was advised, and on December 5, 1919, this procedure was adopted:

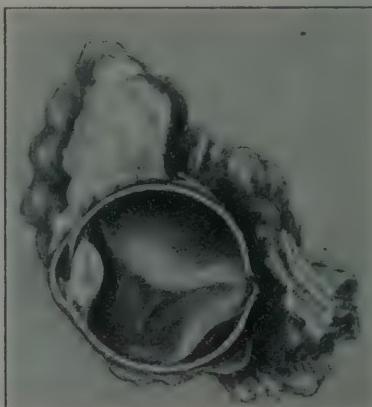


Fig. 2.—Epibulbar Carcinoma and adjacent orbital tissue.

The contents of the orbit, together with the eyeball, were exenterated in the usual manner, and the bleeding controlled by packing and pressing against the apex of the orbit some surgical wax. The cavity was loosely packed, and directly in the center of the packing two radium bullets were placed, each containing 30 mgm. of radium element, which remained in position for eighteen hours. Convalescence proceeded without complications, and the patient was discharged four weeks after the operation, the orbital cavity being free from suppuration and markedly contracted, the only dressing required being a small

ball of surgical gauze. Up to the present time no report has been received from the patient indicating any return of the growth, altho he has not actually been examined in the hospital since January 14, 1920.

Gross Appearance of the Specimen:
Glycerin-jelly mount of half of the eye-

there is a punched out, central ulcer. The lens has been slightly dislocated backward, and there is extensive detachment of the retina, but no gross signs of exudation, inflammation, or neoplastic tissue within the eyeball, which is of normal size (Fig. 2).

Microscopic Appearances of the

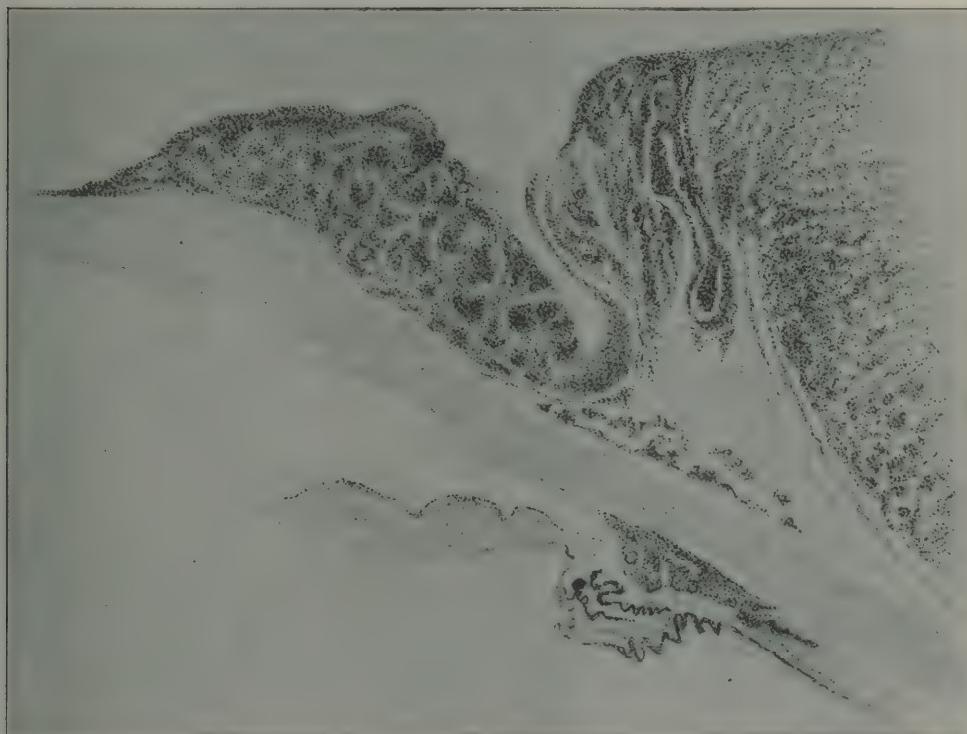


Fig. 4.—Nests of cancer cells in a delicate connective tissue stroma. (High power, b. Low power, a.)

ball, including a mushroom shaped tumor, which arises from the conjunctiva of the corneo-scleral junction and extends posteriorly, together with the adjacent orbital tissue. The growth is in close contact with the sclera, but does not penetrate it. The tumor included in the specimen, about $1 \times 1.5 \times 2$ cm., is circumscribed, nonencapsulated, and has a lobular exterior. The cut surface of the growth is of a dirty white color, surrounded by a marginal zone of varying thickness. A lobule of the neoplasm has encroached upon the upper cornea for a distance of about half a centimeter. The cornea is hazy, and

Specimen: The tumor is composed of small, squamous epithelial cells, and has originated in the conjunctiva, at or just posterior to the limbus, or, in other words, at the position occupied by the upper part of the papilloma removed nine years previously. The growth is entirely extraocular; the bloodvessels underlying it in the limbic zone are engorged, with marked perivascular round celled infiltration. The sclera is without special pathologic features, and the cornea shows only the evidence of pressure edema and the lesions of the central ulcer before noted. Both retina and choroid

are largely detached. Distributed along the choroid posteriorly, and between it and the sclera there is a moderate amount of deeply eosin stained, vacuolated exudation of blood origin. There are no evidences of inflammation (Figs. 3 and 4).

Fragments of the deeper orbital tis-

years after its removal (the exact period is not known), an epibulbar, squamous celled carcinoma, taking its origin at the upper part of the area from which the original growth was removed.

The probable relation of an injury to the development of a papilloma of the limbus, as in the present case, is inter-

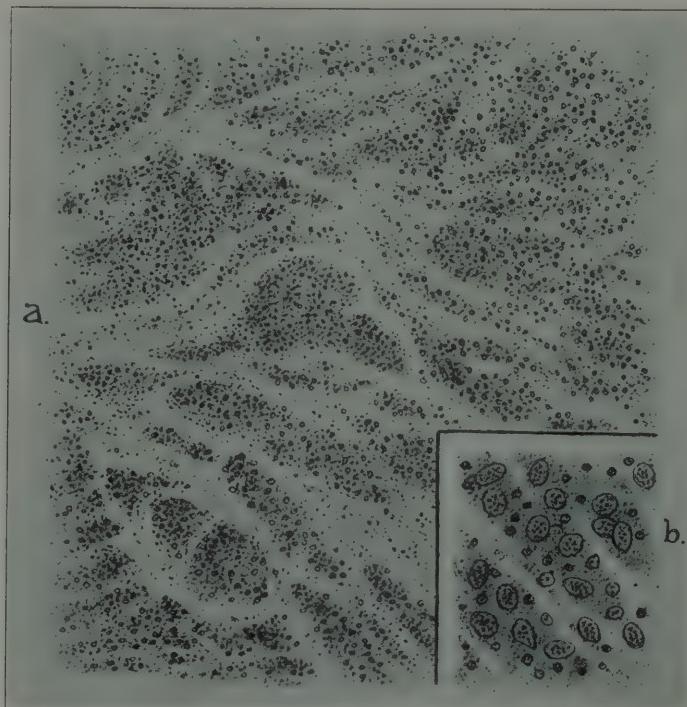


Fig. 4.—Nests of cancer cells in a delicate connective tissue stroma. (High power, b. Low power, a.)

sue are composed of normal areolar fatty tissue, bloodvessels, nerves, and voluntary muscle. Sections of the tissue of the orbit adjacent to the growth are composed of the normal structure of this region, save only for considerable infiltration, which suggests chiefly the effects of traumatic hemorrhage, but does not definitely exhibit neoplastic tissue.

Comment.—After an injury from violent contact with the spines of the fin of a fish, followed by a prolonged period of traumatic conjunctivitis, in turn succeeded, about three years later, by the development of a papilloma at the corneo-scleral junction, there originated, several

esting and well known. The invasion of the cornea is usually a later process. That recurrence in the form of an epithelioma may follow removal of a papilloma in this situation has been noted in not a few instances, and it is suggestive that the microscopic examination of the original growth revealed in one spot an appearance resembling pearly body formation. When this papilloma was excised, radium treatment of such a neoplasm was practically unknown, nor was the method of electric desiccation available. I think it likely that such a technic in the treatment of a growth of this description offers a better chance of avoid-

ing a recurrence in a malignant form than excision.

Of practical importance in connection with epibulbar carcinomas is invasion of the interior of the eyeball, which in the present instance did not take place. Shumway and I, discussing this question in a paper before this Society in 1913,¹ have quoted some opinions and statistics which are here reproduced: Some authors, for example, Axenfeld, Greeff, Wintersteiner, and Saemisch, consider that epibulbar carcinomas rarely penetrate the globe, while Ginsberg and Parsons express an opposite opinion. In 53 eyeballs with epibulbar carcinoma, the records of which we found in the literature, perforation occurred in 20, or 37.6 per cent. Hence, altho the cornea and sclera offer a considerable resistance to the growth of the tumor, especially if Bowman's membrane is intact, it is evident that perforation occurs in a considerable number of cases, especially if the neoplasm has been present for a long period of time. Naturally, this percentage is relatively too high, because the eyes examined were those in which the lesion had assumed serious proportions demanding enucleation.

Frequency of perforation depends largely upon the site of the tumor. It has been found that those growths which are situated at the corneal limbus are much more apt to penetrate the globe than those placed at a distance from it, and, as is well known, the region of the penetrating ciliary vessels presents a feeble resistance to a growing carcinoma, because its cells invade the tissue along the perivascular lymphsheaths.

As the microscopic examinations of the orbital tissue adjacent to the tumor did not definitely reveal neoplastic tissue, it may be questioned whether exenteration of the orbit was necessary, and yet only three months after the enucleation of an eye with the epibulbar carcinoma, reported by Shumway and myself, altho exploration of the orbit failed to reveal suspicious tissue, there was a large recurrence requiring a complete exenteration of the orbital contents. With this case in mind, and because of the apparent involvement of some of the orbital

tissue close to the tumor, removal of the entire orbital contents was justified.

The use of radium after the operation requires no comment, save only to point out that it lessens the danger of recurrence, seems to enhance the rapidity of the healing process, and undoubtedly ameliorates postoperative pain and discomfort.

CASE 2.—*Small, Spindlecelled Hemangioma of the Lower Eyelid of a Child Aged Five Months.*—F. K., a white female infant of five months, was admitted to the Eye Ward of the University Hospital on November 24, 1919, because of a tumor of the right lower eyelid.

History: Ten weeks prior to admission the child's mother first noted a "blue mark" along the eyelid. This rapidly increased in size until the whole lid was involved. The child, a first baby, has always been healthy, was exceedingly well nourished, and the general physical examination was entirely negative.

Ocular Examination: Both eyes were normal in all respects, and the conjunctival surfaces healthy. Extending practically the entire length of the right lower lid, there was an oblong swelling of bluish color, slightly lobulated to the touch, with which were associated a series of cords assumed to be distended vessels. The skin surface appeared to be normal, the integument was not adherent to the underlying tissue. The tumor became turgid, purplish in color, and seemed to increase in size when the child cried. A tentative diagnosis of cavernous angioma was made and its removal advised.

Operation: An operation was performed on November 27, 1919, and the growth dissected from its bed. On exposure it was found to be covered with a delicate, translucent tissue, which evidently was not adherent to the growth, from which it was easily stripped. On the surface of the tumor were a number of large veins of bluish color. The neoplastic tissue was of a slightly reddish-gray color, and apparently took its chief point of origin from the outer end of the lid. The wound was closed with interrupted silk sutures, leaving at the

outer end a small orifice thru which a radium tube (dosage, 15 mgm.) was inserted beneath the suture line along the length of the incision, and allowed to remain in place for ten hours. Very little reaction followed this procedure, and at the end of four days the child was discharged, the wound being completely healed.

cells. Some of the bloodspaces show a characteristic "combing" of the cells which form their walls. Areas of hemorrhage are visible in the interstitial areolar tissue. There is no melanotic pigmentation. The growth, therefore, is a small, spindlecelled hemangiosarcoma (Fig. 5, *a* and *b*).

Comment.—A goodly number of cases

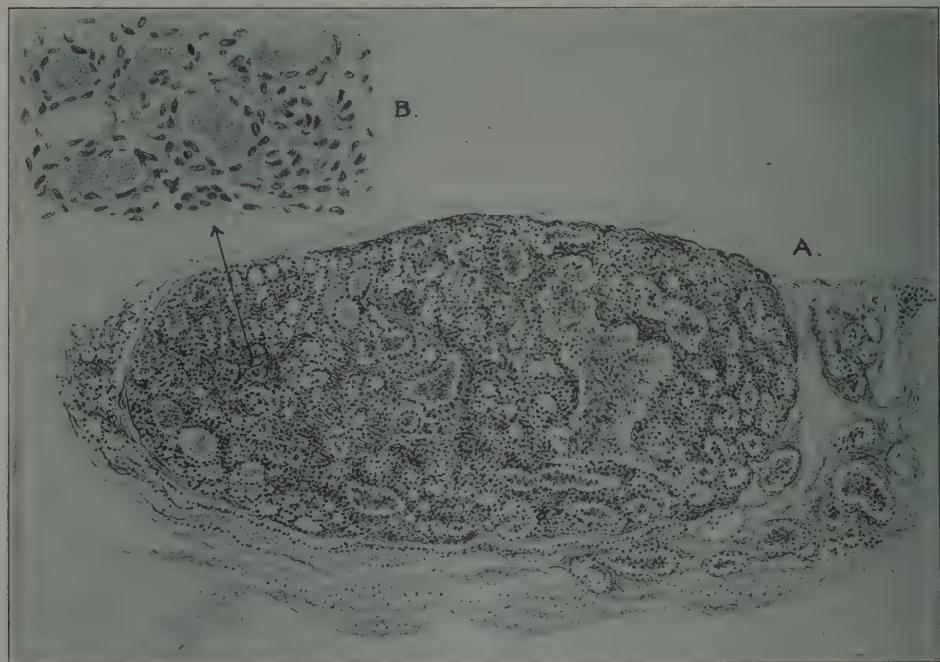


Fig. 5.—Small spindle celled hamangiosarcoma tumor lobule made up of spindle-cells and blood sinuses. (Low power, A.) Blood channel walls formed of tumor cells which show characteristic "combing". (High power, B.)

Microscopic Examination: The growth, nonencapsulated and irregular in outline, is composed of variously sized round and oval islands of tissue, separated one from another by areolar fatty and fibrous connective tissue. These islands are all similar in structure, and are composed of numerous blood channels supported by densely packed and irregularly arranged spindle cells of the young connective tissue type. A few of the largest bloodspaces have poorly developed walls, chiefly made up of connective tissue, but the walls of all of the capillary spaces and many of the larger blood sinuses are composed of tumor

of sarcoma of the eyelid are on record, and in this country statistical information in this regard has been published by Wilmer (1895), Veasey (1899), Alling (1907); and Shumway and myself (1911). At the time of the last named report at least 80 cases had been described, and since then others have been reported. In the collection made by Shumway and myself² in 43 per cent of the cases the sarcoma was roundcelled, in 40 per cent spindlecelled, while in the remainder the cellular type was mixed. Between 30 and 40 per cent of these lid tumors are pigmented. Parsons records 11 per cent of myxosarcomas. Angio-

sarcomas and cylindromas are said to occur more frequently than myxosarcomas. Some of the reported cases of roundcell sarcoma were probably lymphomas.

In Wilmer's list the age of the patients affected varied between ten months and seventy-six years. I have removed a sarcoma from the lid of a negress aged eighty-one. Five months, the age of the subject of this paper, must place this patient among the very youngest of those whose histories have been published.

Altho often small at the time of their removal, some of these tumors reach unusual size, especially the myxosarcomas. I have recorded one such growth which attained a weight of 247 grams; its size was 10 by 8 by 6 cm.

Up to a month ago there was no evidence of recurrence of the tumor described in this communication, but quite recently (June, 1920) the child was examined, and below the line of incision, at the outer end of the lid, a distinct bluish color is visible, altho no growth can be detected on palpating this area. This coloration, however, is certainly suggestive, and the child will be under constant observation and, if required, radium treatment.

CASE 3.—Concussioned Eye Following Revolver-shot Wound of Orbit; Microscopic Examination of the Enucleated Globe.—J. C., a colored man aged thirty, was admitted to the Eye Ward of the University Hospital on September 10, 1919, within one hour after he had been shot thru the right orbit with a 45-caliber revolver, held at close range.

Physical Examination: The patient, a well nourished adult, was badly shocked and rallied rather slowly under anti-shock treatment. General physical examination failed to reveal any abnormal condition other than that produced by the injury. The bullet had entered the left side of the nose on a level with the eyes, had traversed the ethmoid (as shown by the X-rays), crossed the orbit, and was lodged in a region outside of its walls to the right and below the apex.

Ocular Examination: Except for a few powder burns of the lid, the left eye was normal and had normal vision.

The right eye was markedly proptosed, the conjunctiva intensely chemotic and ecchymotic, the lids swollen and containing extravasated blood. The cornea was clear, the shape of the eyeball apparently unchanged, and the ophthalmoscope revealed in typical profusion the lesions which Colonel Lister has described as those peculiar to the "grossly concussioned fundus."

Everywhere there were sheets and clouds of hemorrhage; the disc was only dimly made out, being partly covered with blood, and completely surrounded by widespread areas of hemorrhage. Here and there were white patches. Some of the blood was apparently pre-retinal in situation, but there was no free hemorrhage in the vitreous. The eye was entirely blind. The tension, as far as it was possible to measure it, was neither elevated nor lowered. The patient suffered much pain. Within twelve hours the cornea was too steamy to allow further study of the fundus, and a small, yellowish infiltration began to appear slightly below its center. The exophthalmos and the pain had markedly increased.

The eyeball was therefore enucleated, and showed no sign of rupture, altho carefully inspected. The tissues of the orbit were infiltrated with blood, and the wound of exit thru the outer orbital wall far posteriorly was explored without detecting the bullet. About 10 mm. of the orbital nerve was secured, and its coats were intact, altho evidently bruised, but it had not been jerked from its entrance point into the globe. The patient made an uncomplicated recovery, and was discharged from the hospital one week after admission.

Microscopic Examination of the Eye-ball and Optic Nerve: A large number of sections of the eyeball (22) and of the optic nerve (39), were prepared. The cornea is somewhat conical in shape, and contains no lesions other than those which were clinically evident. At the limbar region of the cornea there are vascular engorgement, interstitial hemorrhage, and lymphocytic and polymorphonuclear infiltration.

The anterior chamber is deep and free

from exudate. The lens occupies its normal position and shows no pathologic changes. The iris and ciliary body are congested and markedly edematous. The vitreous is negative.

The retina is widely detached on one side (Fig. 6, *a*), and everywhere is the seat of extensive areas of hemorrhage,

leukocytes. The lamina cribrosa stands out sharply, and is accentuated by an almost total destruction of the optic nerve-fibers. The nerve fibers which remain exhibit edema, hydropic degeneration, and are infiltrated with lymphocytes and polynuclears. The fibrous septa are also thickly infiltrated.



Fig. 6.—(a) Separation of retina on one side and position from which section of retina, choroid and sclera was made. (b) Section of retina, choroid and sclera showing distribution of hemorrhage as noted in text.

most marked in the layers of the rods and cones. In all its layers are the evidences of cellular distortion due to co-existing edema.

Throughout the choroid there are numerous and extensive interstitial hemorrhages. Except for the presence of superficial areas of hemorrhage, the sclera exhibits no lesions (Fig. 6, *b*).

Examination of a number of serial sections (1-13) of the optic nerve (retrobulbar and transversely cut) reveals the following conditions: The central vessels contain a few red cells and many

Between the pial and dural portions of the optic nerve sheath there is an area of hemorrhage which circumscribes the nerve. The extradural lesions included in these sections are the seat of interstitial hemorrhage, edema, and lymphocytic and polynuclear infiltration (Fig. 7).

The sections of the optic nerve as it enters the globe (27-37) indicate considerable swelling of the nervehead. The fibers are degenerated, finely vacuolated, and thickly infiltrated with lymphocytes; an occasional polymorphonuclear is vis-

ible. The cause of this swelling of the nervehead appears to be an acute inflammatory condition. Special tangential sections of the posterior pole of the eyeball, not including the optic nerve, show, in so far as the retina and choroid are concerned, the hemorrhagic lesions already described.

Comment.—Many concussed eye-

cussion had produced the ophthalmoscopic lesions which have been described, added to which are those evident within the sheath of the optic nerve. These lesions antedate by a considerable time those which occur secondarily, the most important being atrophic chorioretinitis (spots of atrophy, exposed scleral areas and pigment distribution, heaping and

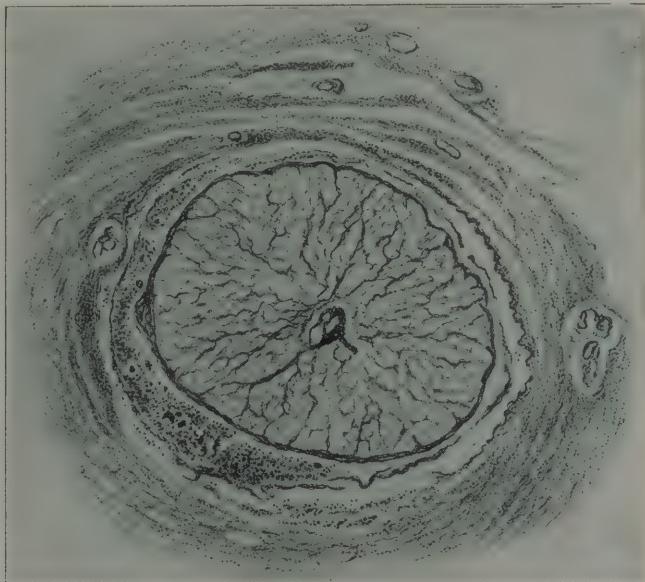


Fig. 7.—Transverse section of optic nerve. Atrophy of fibers, perineural hemorrhage, fibrosis of dura with intradural hemorrhage and perivascular (melanotic?) pigmentation.

balls, both in early and late stages, have been examined ophthalmoscopically and microscopically during the late war; and we are indebted especially to Colonel Lister, to Lagrange, and to v. Szily for information in this regard. Some of these data, as well as some of my own observations, I have summarized in a paper entitled "Concerning Concussion and Contusion Injuries of the Eyes in Warfare."⁷³

Evidently the case in question belongs to that group in which the concussion results are produced by the passage of a missile thru the orbit behind without rupture of the globe. Its chief interest resides in the fact that the eye was secured very early after the effects of the con-

fringing) and proliferating chorioretinitis. This secondary chorioretinitis proliferans is essentially a cicatricial process, with organization of hemorrhages. But this is of less importance than the irritating effect of the hemorrhages, already noticeable in specimens, on the connective tissue of the retinochoroidal layers inciting them to active proliferation and the formation of tracts, areas, and masses of fibrous tissue. The whole process and picture differ materially from the socalled proliferating retinitis of recurring hemorrhages in the vitreous, especially in young subjects, often noted in civilian life. Of marked interest are the extensive degeneration of the optic nerve fibers and the lymphocytic and polynuclear infiltration, as well as the

hemorrhages in the optic nervesheath which have many times been noted in eyes examined after concussion injuries during warfare. Evidently in this case the missile, passing thru the orbit, bruised but did not penetrate the eyeball, and caused the extensive hemorrhagic lesions of the retina and choroid; bruised but

did not cut across the optic nerve, and caused a rapid destruction and hydropic degeneration of most of its fibers and a hematoma of the sheath. These conditions also explain the marked papilledema, microscopically evident, which was beginning to take on the lesions of an acute inflammatory edema.

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PRIMARY EPIBULBAR CARCINOMA.

F. PHINIZY CALHOUN, M.D., F.A.C.S.

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This paper reports a case in which after repeated operations upon the growth there had been no recurrence after six years. The pathologic specimens were examined by different pathologists who concurred in the diagnosis. Read before the American Academy of Ophthalmology and Oto-Laryngology, October, 1920.

The subject of epibulbar carcinoma is ever an increasing one, and the following case offers some features which seem worthy of recording.

D. McC., age 64, a farmer and merchant of Mississippi, was seen in 1914, complaining of defective vision in the



Fig. 1.—Primary epibulbar carcinoma.

left eye, but more especially of a tumor formation of long standing in the left lower lid, which recently had rapidly grown in size.

There is no history of cancer in the family, and the patient's father died in his 84th year from "old age." His mother died of tuberculosis in middle life and there is also a sister who died of the same malady. The other members of his family are living and reported to be healthy.

The patient states that with the exception of two attacks of influenza he has been remarkably healthy and has always led an active out of door life.

His vision had been good until eighteen years ago when "wild hairs" caused considerable irritation to his eyes. A ptery-

gium was removed from the left eye, and two years afterwards a growth developed on the globe of the same eye, which was pronounced malignant. Later he states that an Eastern confrere of note expressed an opposite opinion after the bulbar growth had been entirely removed at this last consultation. The eye remained quiet until six weeks before he came under my observation, when noticing a tumor formation in the lower lid, the patient again consulted a surgeon in a neighboring city. From the statement which I received, the growth was evidently mistaken for a granulating chalazion, as an attempt was made to incise and curette it which operation caused the growth to enlarge.

A physical examination of the abdominal and thoracic viscera did not reveal anything abnormal, yet the man was decidedly underweight. An examination of the blood and urine showed that they were within normal limits for one of his age. On the left side of his neck, the right shoulder and dorsal surface of the left hand were small dry epitheliomatous areas which had been present many years.

Eye examination: O. D. 20/40 + 2.00 ax. 45° = 20/20. There was a slight drooping of the upper lid and the conjunctiva showed a few scars from an old trachoma. There was seen a small corneal scar at the nasal limbus, evidently the remnant of an atrophic pterygium. The fundus and tension was normal. O. S. 18/200. The upper lid drooped considerably, there was a decided entropion and most of the lashes were missing from epilation. There was a small peripheral corneal scar from a pterygium operation, and the cornea was well covered with an avascular pannus. The conjunctiva of the upper lid showed trachomatous scars. The cul-de-sac of the lower lid was completely obliterated

by a tumor about the size of a hazel nut, which was firmly attached to the sclera, and the globe could be moved by any motion of the tumor. The upper limit of the growth was slightly above the lower limbus line and there were evidences of recent instrumentation. The integument was freely movable over the tumor and when the lids were gently

suggested the application of radium. A tube containing 20 m.g. was applied to the raw surface of the lid for an hour and thirty minutes. As there was no reaction, another application for two hours was made two weeks later, and again repeated in two weeks for two and a half hours with an intense reaction to the lids and globe. The edema subsided

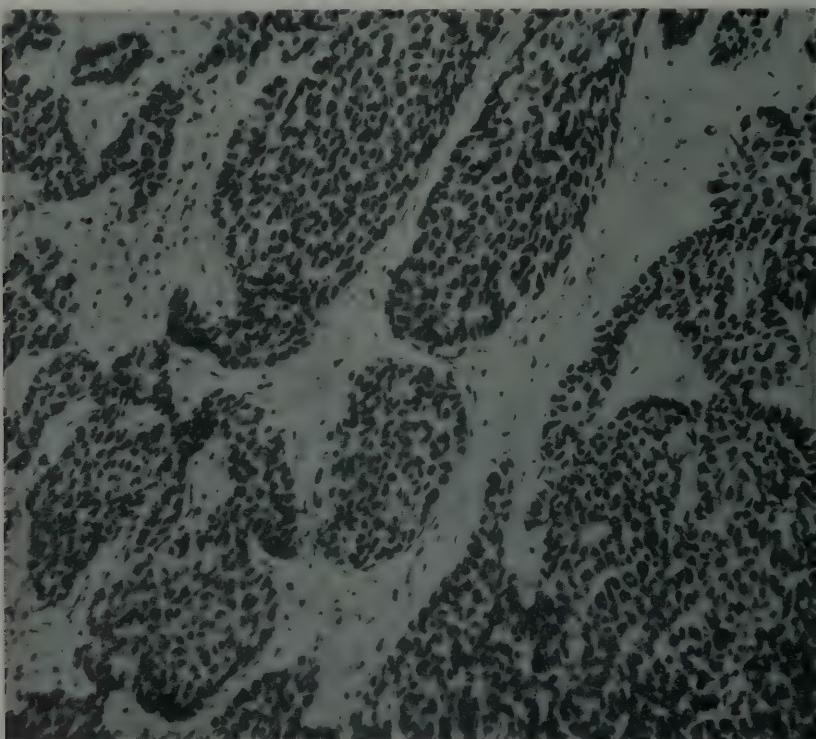


Fig. 2.—Section of primary lid tumor. Typical of carcinoma. Low magnification.

closed, the external appearance very much resembled a large chalazion.

Being of the opinion that the tumor was malignant, I urged that an enucleation be done if a pathologic report confirmed the clinical diagnosis, to which he positively refused. He only desired the removal of the growth, which was performed under ether anesthesia.

The growth was easily exposed and to my surprise, it readily "shelled out" from its scleral attachment. No effort was made to close over the raw surface.

Two days later I received the report that the tumor was carcinoma and I

entirely in six days when the patient was temporarily dismissed. Marked contraction was taking place in the lower lid, with the lid adhering to the globe.

Two months later the patient returned for observation and the vision had improved to 20/70; the cornea was remarkably clear, and there was no indication of a recurrence of the growth. The fundus was normal.

One year later the patient discovered an enlargement in front of the left ear and he was advised to return for observation. The condition then was as follows:

Marked drooping of the upper lid with

a few lashes which had not been epilated. The pannus returned, and encroaching on the lower fifth of the cornea from each side of the medial line, there was a pterygium like growth of the conjunctiva. The lower lid was adherent to the globe, and at the site of the original growth there could be felt a slight elevation about the size of a large grain of

case confidently expecting a return of the original growth and a metastasis, but he was seen April, 1920, over six years after the first operation, and the eye was quiet except for the complication of a chronic trachoma.

As the original growth had been so readily removed, I had doubted the correctness of my diagnosis, and as I did

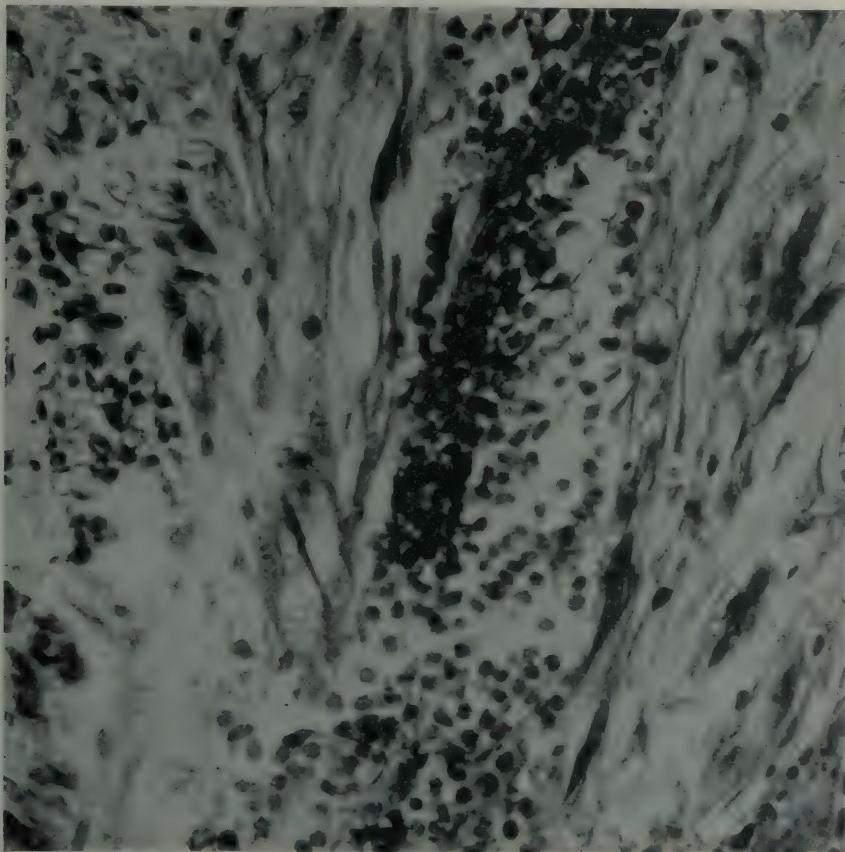


Fig. 3.—High magnification of Fig. 2, showing especially mucoid degeneration of connective tissue stroma.

rice. Situated beneath the skin in front of the tragus of the left ear was a movable gland.

I again urged an enucleation to which the patient refused, and he was content with the removal of the recurrent growth and gland, both of which were done under local anesthesia. The wounds healed nicely and shortly afterwards he was dismissed.

I have kept close observation of the

not wish to risk solely my opinion and that of the pathologist as to its malignancy, I had sent sections to three other pathologists of wider experience, all of whom unhesitatingly concurred in the same diagnosis. The report of Dr. Geo. S. Dixon was in part as follows:

"The sections show an alveolar stroma of connective tissue filled with epithelial cells of the basal variety after the manner of true carcinoma. The connective tissue

has undergone mucoid degeneration to a considerable extent, and where this has not occurred the stroma holds a fair number of small round and lymphoid cells. Vessels are not very numerous, and there is some epithelial degeneration within the alveoli.

Diagnosis: Carcinoma myxomatoides. The recurrent tissue shows the same

mm. Of course the preauricular gland is normally very small, but there are so few lymphoid cell remaining in this specimen (and they are just under the capsule) that it seems evident a considerable number have been absorbed. Practically the entire tumor is carcinomatous, and of the same character as the tumor of the lid without its degeneration. The



Fig. 4.—Section of recurrent growth in lid intimate with sclera, a fragment of which is seen.

general characteristics, but without the mucoid degeneration of the connective tissue stroma, more irritation and less epithelial degeneration possibly owing to being a younger growth than the original,—given the same time the same degeneration would doubtless occur. There is a small amount of scleral tissue attached to one border of this growth.

The preauricular gland is a metastatic growth. It measured $9.5 \times 11.5 \times 12.5$

cells here are younger, densely packed in the alveoli and in very good condition as compared with those of the other two specimens. The connective tissue stroma is rather scanty."

The clinical diagnosis of primary epibulbar carcinoma was confirmed by pathologic examination and more than likely its origin was in the conjunctiva at the limbus, for as is well known where one kind of epithelium passes into an-

other, as such is the case in the epithelium of the cornea and conjunctiva, it is a favorite site for epitheliomatous growths. A pterygium operation antedating the growth of the tumor by about two years and the irritation of the globe from ingrowing cilia, may have had their influence in the development of the neoplasm.

tion occurred in 20 cases or 37.7 per cent. When the globe is invaded it is along the perivasculär and perineurial lymph spaces of the corneo-sclerotic junction, never elsewhere, says Parsons.

The proper surgical procedure in any case of epibulbar carcinoma is to me always a matter of grave concern, and the dictum of de Schweinitz is one worth

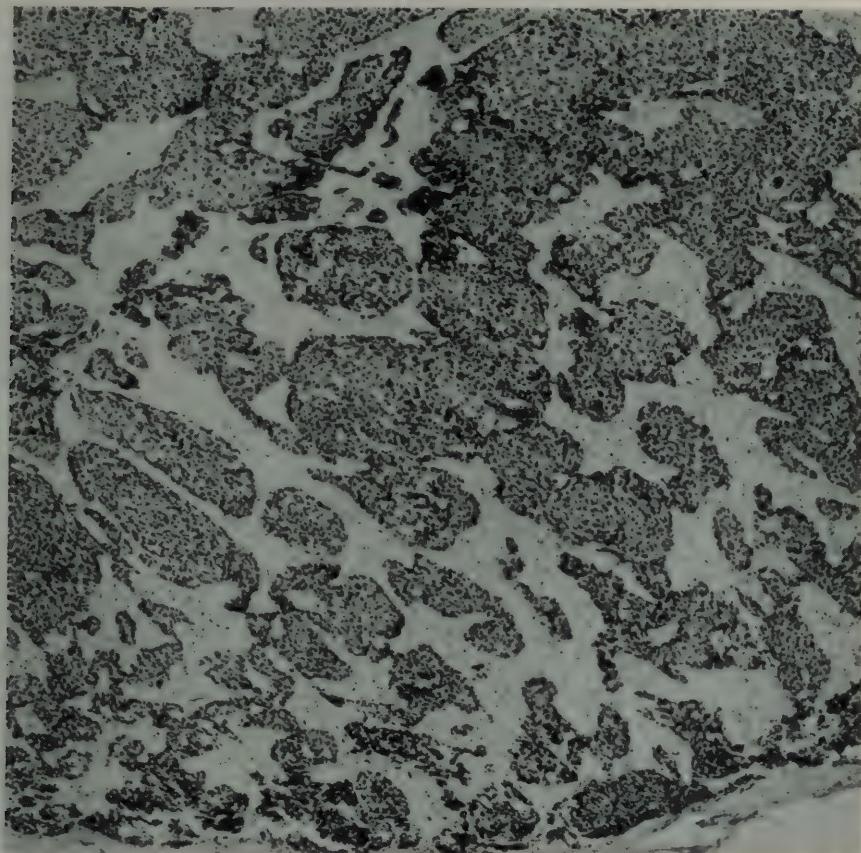


Fig. 5.—Section of tumor of preauricular gland, which is entirely carcinomatous. Low power.

As to the question of the invasion of the globe, many authors are at variance in their views, as for instance, Axenfeld, Greeff and Saemisch believe the eyeball is rarely penetrated, while a contrary opinion is expressed by Parsons and de Schweinitz. The latter proved that perforation does take place in a considerable number of cases, especially if the growth was of long duration, for he showed that in 53 reported cases perfora-

remembering: that is, if the growth is small and situated at the limbus, a deep excision may be made but the case closely watched for developments. Whereas a larger growth further removed from the limbus may be excised with greater safety, as it is further away from the penetrating ciliary vessels.

While a lymphatic glandular involvement is not a common occurrence (the preauricular first affected and later the

submaxillary), it is usually regarded as an indication for an enucleation or a more radical operation in the orbit.

A point of interest in this and other cases is the slowness with which these malignant tumors develop. Irritation from cauterization or palliative surgery apparently excites their growth.

In regard to the treatment with radium

of new cells as well as the clearing up of the cornea which temporarily gave better vision.

My experience in this one case has led me to draw the following conclusions:

(1) Conservative surgery is indicated when the epibulbar growth is remote from the limbus, even tho it may be large.

(2) A preauricular glandular enlarge-

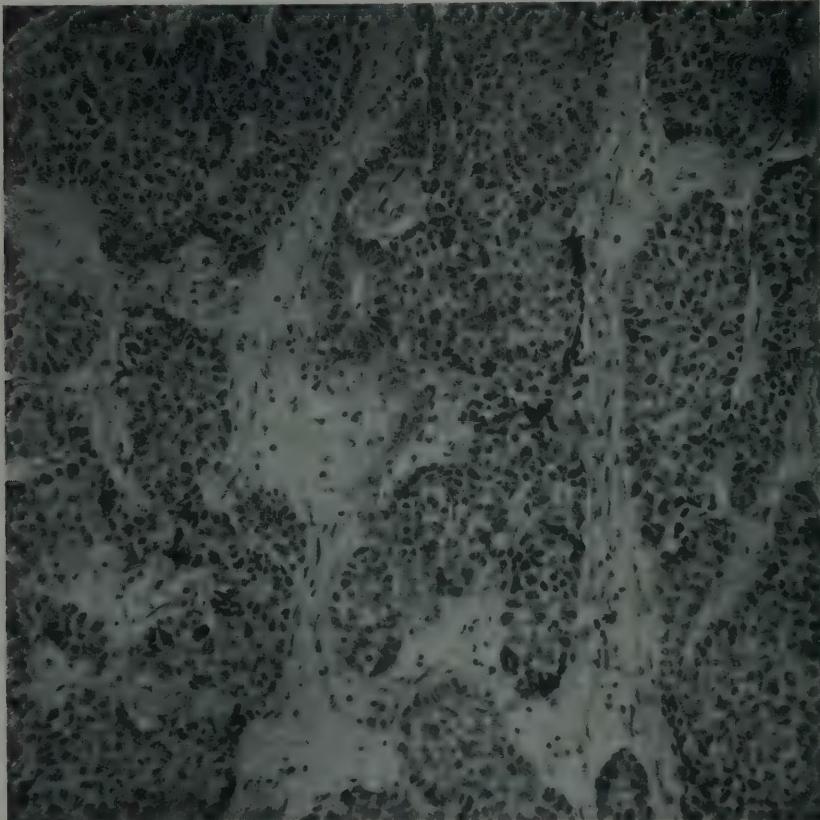


Fig. 6.—High magnification of Fig. 5. The cells are young and densely packed.

of carcinomatous areas of the lid after the excision of the growth, it is now a procedure often employed. While the end results of treatment in this case have been satisfactory, radium may have had its influence in arresting the development

ment is not a serious complication as long as the lid tissues are not breaking down.

(3) Radium or other similar rays may be of value as an agent against recurrence when used early after the operation.

THE TARSUS MADE PLIABLE AS A CURE FOR TRACHOMA.

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NEW ORLEANS, LA.

This technic aims to soften the infiltrated tarsus as seen in trachoma. The writer claims as good results as when the tarsus is extirpated.

This illustrated article of a technic of mine, for the treatment of trachoma, is submitted for the reason that it appears correct in principle, is based upon reasonable deduction and has given most satisfactory results. In principle it is correct for it does not produce more scar tissue as a means to a cure, in what is already a scar tissue producing disease. It does not adopt destructive caustics and such mechanical means that scrape, scarify and



Fig. 1.—Rod, made from street car trolley wire, bent at one end

destroy the epithelium; but to the contrary its aim is to obviate the production of scar tissue with its mutilating effect. It does not accept that we are justified in imitating nature's curative process by the laying down of contractile tissue.

The deduction is drawn from a consideration of the disease histologically, pathologically and from the physiologic changes produced by the treatment. The disease is a folliculosis with an infiltration of the deeper tissues; and the degree of this infiltration lends itself as a differentiating factor between trachoma and follicular conjunctivitis, for in trachoma the infiltration is greater. The importance of this infiltration, particularly that of the tarsus, is stressed for it obtains in the trachomatous process to an extent that is not usually taken cognizance of; and if treated, according to the suggested technic, demonstrates to what measure this fibroelastic tissue was involved.

This tarsal pathology is to be noted early in the disease and the ptosis so commonly observed is thus explained. The operation of Heisrath and Kuhnt which is an excision of the tarsus, aims to rid the eye of this infiltrated tissue; and we obtain very favorable reports from those

adopting it. The treatment advocated by me is to make pliable this infiltrated tarsus obtaining the same beneficial effect without being compelled to remove it. It offers the advantage that while making it pliable you expel the contents of the follicles and produce other changes that



Fig. 2.—Cotton wrapped rod under everted tarsus, pressure made up towards thumb, and rod rotated.

are to be desired. During the treatment an ischemia with its subsequent hyperemia is produced, which is unquestionably followed by an increased leucocytosis. The infiltrated tarsus is depleted.

Before the suggested manipulations are undertaken all possible care is given to the preparation of the patient. The secretion which is very commonly noted is best explained as the result of a chance infection, and is to be treated for days and cleared up before proceeding. This chance infection is to be studied microscopically. When rigid cleanliness and antiseptic treatment is adopted it is surprising how rapidly it will improve. A warning is to be sounded not to use the albuminous silver preparations in treating and preparing the patient, for you may permanently stain the cornea and conjunctiva. It appears that in trachoma these tissues are readily stained. That the secretion is improved by treatment is quite evident and it is not essential for the clinical syndrome.

Mercurochrome is most helpful in clearing up this secretion. The eye is immersed in a one-half of one per cent aqueous solution, three or more times daily; or a zinc solution is used with great advantage. The patient is prepared in the usual surgical manner and the whole procedure is carried out with reasonable precaution in protecting against infection. Much of the long delay in obtaining results after these different mechanical techniques is due to neglect of these precautions.

This suggested mechanical treatment demands but a single sitting and general anesthesia is required. Good results are

so that it may be easily inserted under the everted tarsus. The lid is everted and the cotton wrapped probe which is dipped in sterile water, is inserted under the tarsus and with the thumb holding the lid everted pressure is made with the cotton wrapped probe up towards the thumb and the thumb is pressed towards the probe causing the tarsus to bend and at the same time the probe is rotated. This manipulation presses out the contents of the follicles and depletes the infiltration.

You may repeat the manipulations a number of times, making certain that all follicles are emptied, and repeating the



Fig. 3.—Removing all follicular contents.



Fig. 4.—Method of rolling the lid to keep tarsus pliable.

to be accomplished with local anesthesia, but demands more than one sitting as it does not offer an opportunity for completeness. Many who have adopted the repeated treatments under local anesthesia claim for it an advantage, for by compulsion it is more gentle and it repeats the improvement obtained by repeating the ischemia and hyperemia which is greatly desired. It is immaterial which method you adopt for from either you will obtain gratifying results.

METHOD OF PROCEDURE.

This is shown in Fig. 1. A heavy piece of copper wire, of the size used for street car cable, with a length of about eight inches is bent slightly about two inches from the end. The rod is wrapped evenly and carefully with cotton for the distance of the bent portion and only sufficient cotton is used as a wrapping

benefit obtained by the leucocytosis produced. The tarsus which at first was indurated becomes pliable, and it is with ease that you can now manipulate it. It is softened and might be compared to a piece of wet leather for it is easily bent and can be turned in many directions. The manipulations are done gently and the probe is not to injure or destroy the epithelium.

Fig. 3 shows to what extent the conjunctiva and tarsus may be squeezed. Fig. 4 gives a method for keeping the tarsus pliable.

IN CONCLUSION—This technic of mine does not destroy or injure the epithelium. It does not produce scar tissue. It depletes an indurated tarsus, making it soft and pliable; and accomplishes results as if the tarsus had been removed; and more it expresses the follicles and stimulates a leucocytosis.

THERMOPHORE STUDIES IN GLAUCOMA

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ST. LOUIS, MO.

Effects previously observed suggested the thermophore might produce experimental glaucoma. These experiments show that in the rabbit it furnished a method of reducing intraocular tension instead of increasing it. Its trial on the human eye in two cases of glaucoma indicated that it offered marked possibilities in the effective treatment of that disease. Presented at the Section on Ophthalmology of the American Medical Association April, 1920. Published here by courtesy of the JOURNAL OF THE A. M. A.

The original series of studies on the effects of heat on the eye, was directed toward a method of improving our present means of treating hypopyon keratitis, serpiginous ulcer of the cornea. During the period of experimen-

about the same changes as 130 F. applied for ten minutes, and in the spring of 1919 we undertook a series of experiments for working out this idea.

The prolonged exposure required in these investigations rendered unsuit-

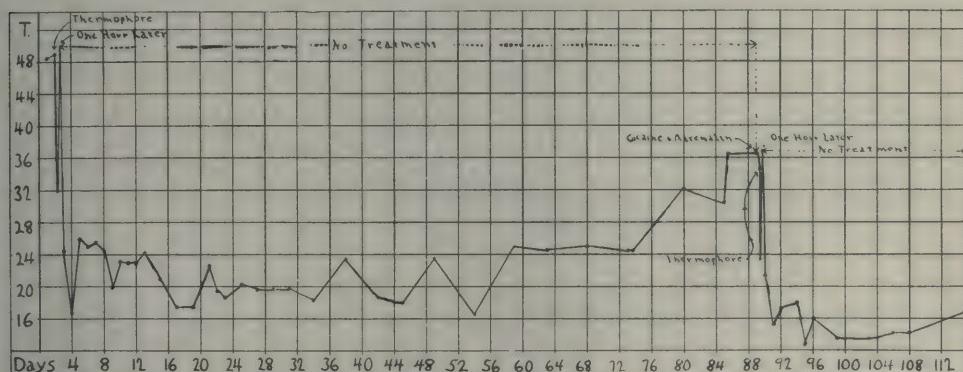


Chart 1 (Case 2).—In this case the tonometric readings were made only after the use of holocain and after the thermophore application, so that the cocaine-epinephrin reaction, of which we were at that time unaware, is not shown. The drop from 49 to 32 is probably this reaction and not due to the immediate effect of the heat. The rebound, however, is shown by the steep jump from 32 to 50 within one hour of the application. The deep drop from 50 to 16.5 during the next two days without any treatment shows the thermophore reaction. There is a long period of oscillation within normal limits until the eightieth day, when the tension rises to 32 and to 36.5 by the eighty-ninth day. Here a slight cocaine-epinephrin reaction is shown with a deep drop to 23.5 and a rebound to 37 within an hour, with the thermophore drop to 12.5 within the next four days, and a slow tendency to rise. The case is still under observation without treatment, and we are awaiting with interest its future tonometric history.

tation, clinical application and routine use of the technic finally evolved, a number of collateral issues came up, some of which promise to equal or surpass in importance the original work. Among these is the effect of heat on normal and pathologic intraocular tension.

It was early noted that when 130 F. was conducted for ten minutes into the anterior chamber of a rabbit's eye thru the cornea, an atrophy of iris tissues with thickening of the base of the iris and occlusion of the filtration angle occurred. This suggested the possibility of producing an experimental glaucoma. We found that 140 F. applied for five minutes would induce

able the simplified thermophore used in treating ulcers. Accordingly, we had recourse to a more complicated electrically heated instrument, with automatic thermostat control.

This instrument has been developed until it is now in a substantial and practical form, always available and rarely out of order. It will suffice to say here that by means of it, short nickel-plated brass rods can be raised to any desired temperature and held constantly at this temperature for any length of time. These rods we have termed "conductors," their purpose being the storage of heat and its conduction into the tissues. The ends of these rods are turned down to various sizes

or dressed into different shapes, usually flat and circular, but sometimes concave and sometimes rectangular or cone shaped. All these ends are intended to be placed in actual direct contact with the tissues into which the heat is to be conducted. Hence we have termed them "contact surfaces." For anesthesia, we used these solutions:

1. Holocain, $1\frac{1}{4}$ grains; distilled

Our scheme now was to apply this contact surface to the cornea opposite the root of the iris for five minutes at 140 F.; then wait until the reaction from this application had subsided and then to apply it again alongside the site of the first application; then to repeat the process until the entire root of the iris had been acted on. Detailed history follows:

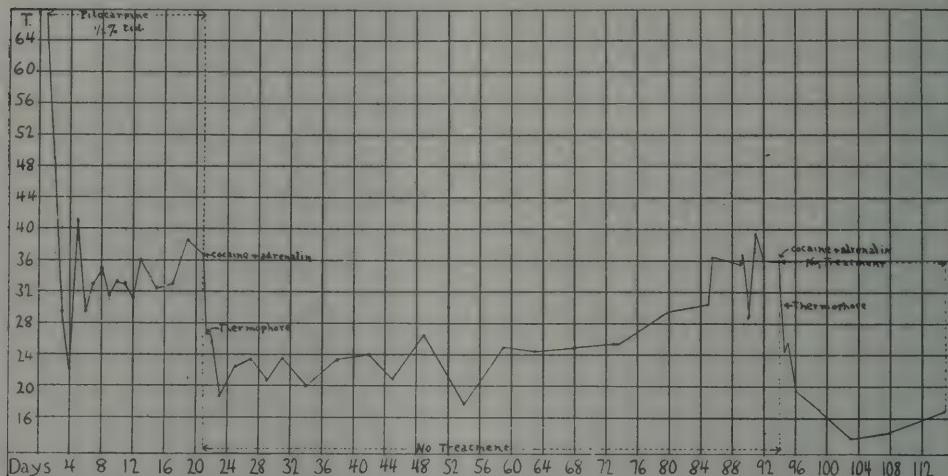


Chart 2 (Case 2).—This chart shows a steep drop from 67 to 22 under pilocarpin hydrochlorid in three days, then a rebound under this treatment, and then oscillation at a rather high mean level until the twentieth day, when the thermophore technic was applied. Cocain-epinephrin reduced the tension from 36.5 to 26.5, and the thermophore reaction carried it on down to 18.5 within the next two days. The rebound is not shown here because we had not been sufficiently impressed by it to be on the lookout for it, and the tension was not taken after the thermophore application until the next day. There then followed a period of oscillation at a much lower mean level than the pilocarpin produced, until about the eightieth day, when a rather rapid rise began. On the ninety-fourth day the thermophore technic was again applied, with a rapid lowering of tension without any treatment on succeeding days. The rebound is also not shown here for the same reason as above. It may be significant in the matter of prognosis to note that in both cases after the second heating the tension dropped to a lower level than after the first heating. The case is still under observation.

water, 2 drams; referred to as holocain, 1 per cent.

2. Cocain, 6 grains; epinephrin (adrenalin) 1:1,000, one-half dram; distilled water, sufficient to make 2 drams; referred to as cocaine-epinephrin solution.

3. Cocain, 6 grains; distilled water, 2 drams; referred to as cocaine, 5 per cent.

In our clinical work with glaucomatous eyes we found considerable variations in the effects of the last two solutions.

We constructed a conductor with a curved contact surface 2 by 4 mm. for applying the heat parallel to the limbus and opposite the root of the iris.

REPORT OF EXPERIMENTS.

EXPERIMENT 1.—Rabbit 7, small, tan; cocaine-epinephrin anesthesia. Application to O. D.; O. S. retained as control.

June 4, 1919, application to O. D. as above described. Transient myosis (against cocaine mydriases). Destruction of epithelium and clouding of Bowman's membrane at site of application. Hyperemia of adjacent conjunctiva.

June 9, epithelium replaced, cornea clearing. Iris turning gray opposite site of application. (Note appearance of iris atrophy five days after treatment. In our subsequent clinical applications we found it much more dif-

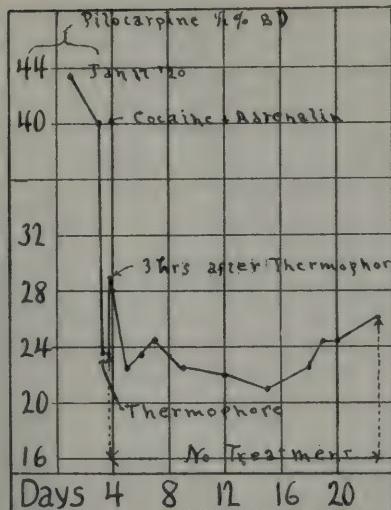


Chart 3 (Case 3, Mrs. S. T., left eye).—This case had been treated for about six months with pilocarpin, 0.5 per cent, twice a day, with a tension oscillating above 40. The cocaine-epinephrin reaction brought it from 40 to 23.5 within the usual time (from twenty-five to thirty minutes.) After three hours there was still some of the rebound, the tension being 29. On subsequent days there was an oscillation at a low level, with a slow tendency to rise. The case is still under observation.

ficult to produce this atrophy in the human eye.) Iris somewhat drawn toward site of heated area (in this instance upward).

June 11, eye quiet. Iris gray opposite application of June 4. Applied thermophore 140 F. five minutes to upper inner quadrant. On this date we began attempting to measure the tension by means of the Schiötz type, and a balastic spring type of tonometer. Our readings varied so widely that we gave up the attempt for the time being as futile.

June 16, another application.

July 11, no evidence of rising tension. Treated eye feels softer than the opposite (control) eye.

August 29, two applications at different sites.

September 15, final application. We had now completed the ring around the cornea parallel to the limbus as nearly as we could get it tho some of the applications were rather far out on the cornea.

September 29, reaction not yet sub-

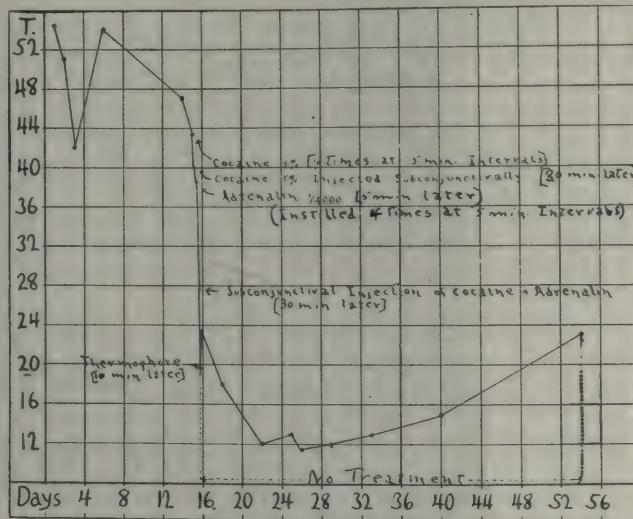


Chart 4 (Case 4, Mrs. L. H., left eye).—This shows the effect of cocaine used alone and then followed by epinephrin and epinephrin-cocain on glaucomatous eyes. Tension after holocain was 43.5. Then cocaine, 5 per cent, was instilled at five minute intervals until four instillations had been made. Ten minutes after the last instillation (thirty minutes after the initial instillation) the tension was 40, a very slight fall. About 2 minimis cocaine, 0.5 per cent, were now injected subconjunctivally, and five minutes later the tension again taken; it was 38.5. This was a drop of only 5 points. Epinephrin solution, 1:4,000, was then used four times at five minute intervals, and ten minutes after the last instillation, tension was 27.5. A subconjunctival injection of about 2 minimis of cocaine-epinephrin solution was now made, and ten minutes after this the tension was 20. This series of observations seems to indicate that epinephrin acts as a powerful adjuvant to the tension-reducing power of cocaine in glaucomatous eyes. The thermophore was used at this point, and a slight rebound shows. The usual period of low tension with a gradual tendency to rise followed.

sided. Eye feels definitely softer than O. S. During this time we had been studying the causes of failure to get dependable tonometric readings and found that if we placed the rabbit within a small sack just deep enough and wide enough to hold it tightly and to allow its head to stick out, then, with the eyes thoroly anesthetized, lay it over on its side and hold it firmly, we could get satisfactory measurements. It was necessary to observe the further precaution of opening the lids

clouding of anterior capsule of lens opposite this area. Pupil O. D. somewhat smaller than pupil O. S. and slightly irregular. Ophthalmoscope, O. D., shows that some of the gray areas in the iris are decidedly translucent. Disc and details of fundus appear normal. All inflammatory symptoms gone.

We find, therefore, that instead of producing a glaucomatous eye, we produced one with an abnormally low tension which persisted after all inflammation had subsided, and all changes

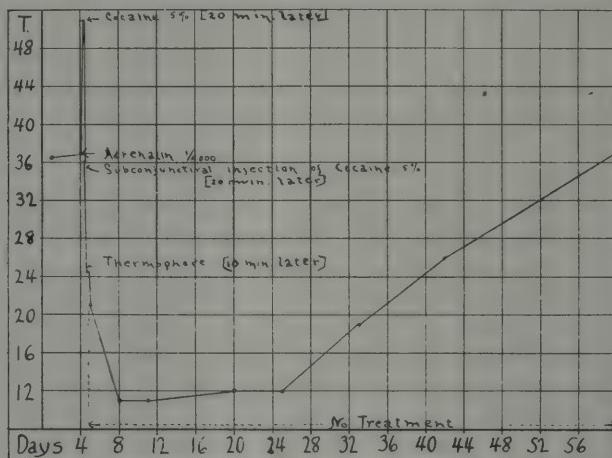


Chart 5 (Case 8, Mrs. S. J. B., right eye).—This is to show the effect of epinephrin when used alone on a glaucomatous eye, and when combined with cocaine. For the first four days of observation the tension was just above 36. On the fourth day after holocain, the tension was 37. Epinephrin, 1:4,000, was then instilled three times at five minute intervals. Then five minutes after the last instillation the tension was 51, a rise of 15 points. Cocain, 5 per cent, was then instilled three times at five minute intervals, and five minutes after the last instillation the tension had again fallen to 36. About 2 minims of cocaine-epinephrin were then injected subconjunctivally, and ten minutes afterward the tension was 24.5. This seems to indicate that epinephrin used on a glaucomatous eye raises the tension, which promptly falls when cocaine is added, and is still further reduced by the combination of cocaine and epinephrin. The thermophore was applied at this point. The tension was not taken an hour afterward, so that the rebound does not appear on the chart. Subsequent days showed marked low tension, with a steady rise after the twenty-fifth day.

slowly and gently, being very careful not to exert any pressure on the globe with our fingers.

All readings noted below were taken by one of two Schiötz tonometers that we were using, the usual checking precautions being constantly observed:

D=DEFLECTION; T=TENSION

Oct. 6, O. D. with 5.5 gm. wgt., D=10, T= 8 mm. Hg
O. S. with 7.5 gm. wgt., D= 6, T=22 mm. Hg
Oct. 27, O. D. with 5.5 gm. wgt., D=11, T= 7 mm. Hg
O. S. with 5.5 gm. wgt., D= 4, T=21 mm. Hg
Nov. 3, O. D. with 5.5 gm. wgt., D=10, T= 8 mm. Hg
O. S. with 5.5 gm. wgt., D= 3, T=25 mm. Hg

November 3, irregular circle of gray entirely around iris O. D. Cornea slightly nebulous below, where application was made far out on it, and slight

seemed to have ceased. The eye was enucleated, Nov. 3, 1919, for microscopic examination. Being now confident of our tonometric readings, we decided to follow this up by a study of the effect of a single application of heat 140 F. for five minutes, using a conductor with a circular contact surface 4.5 mm. in diameter.

We made this experiment a number of times, of which the following is fairly typical:

EXPERIMENT 2.—Rabbit 19, brown; Oct. 8, 1919; cocaine-epinephrin anesthesia O. D. and O. S.

O. D. with 7.5 gm. wgt., D=7.5, T=17
O. S. with 7.5 gm. wgt., D=7.5, T=17

Applied 140 F. for five minutes with 4.5 mm. contact surface to O. D. astride limbus. Corneal epithelium destroyed but replaced in two or three days. Some clouding of Bowman's membrane and hyperemia of conjunctiva, all of which gradually cleared up.

TONOMETRIC HISTORY AFTER TREATING.

	O.D.	O.S.
October 8.....	10	17
October 10.....	8	17
October 13.....	8	17
October 17.....	8	18
October 20.....	15	17
October 22.....	15	19
October 27.....	19	21
October 31.....	22	22
November 5.....	22	22
November 14.....	19.5	22

This shows a sharp drop in tension and then a slow recovery to normal during about three weeks, without any ill effects remaining. We varied this experiment in several ways. For instance:

EXPERIMENT 3.—Rabbit 25, large, white and black; under general anesthesia (ether), applied 145 F. with contact surface 4.5 mm. in diameter for five minutes to O. D., after which tonometer gave:

	O.D.	O.S.	
January 14.....	12.5	12.5	(before heating)
	12.5	?	(after heating)
January 19.....	7.5	18	
February 11.....	19	19	

which indicates that the drop in tension is not caused by the local anesthetic.

Occasionally after cocaine anesthesia without epinephrin we got a transient increase in tension. For instance, on Rabbit 21, Jan. 5, 1920, T=20. Then cocaine 4 per cent. was instilled, and 150 F. was applied for five minutes with 4.5 mm. contact surface, after which:

O. S. with 5.5 gm. wgt., D = 1, T = 35.5
7.5 gm. wgt., D = 3, T = 36.5
10 gm. wgt., D = 5, T = 38

After eight minutes, tension had dropped to 26. This elevation in tension did not always occur when cocaine alone was used. By January 9, tension had slowly dropped to 6 mm. of mercury, and by January 19 had risen to 11.5 mm. of mercury.

Experiments were also conducted to determine the ideal situation for the application. This seemed to be astride the limbus, two-thirds of the contact surface being opposed to the sclera,

and one-third to the cornea. If applied lower on the cornea, the reaction was more intense and the tension not more reduced, nor did it remain low for a longer period. If applied farther back on the sclera, the tension did not drop at once; and when it did go down, usually after twenty-four hours, it never went so low, nor remained down so long, as if applied astride the limbus.

A temperature of 140 F. for five minutes was chosen because lower temperatures and shorter exposures produced less marked and more transient results. A temperature of 150 F. and above applied over the sclera caused permanent changes in the choroid and retina. After application of 160 F. for five minutes, the sclera at the point heated was so weakened that if the eye was excised at once and opened and the sclera rubbed briskly between the thumb and forefinger, a hole corresponding to the heated area was quickly worn thru.

In the early experiments, a circular contact surface 4.5 mm. in diameter was employed. Later, a surface 4 by 7 mm., with a concavity corresponding to the curvature of the sclera, was used.

As no damage to any of the eyes of rabbits treated in the manner described was made out, except in the first case, in which excessive applications were made, it was decided to determine what would be the effects on glaucomatous eyes in man.

REPORT OF CASES.

CASE 1.—The right eye of an old man had been blind and painful for four years with glaucoma. The tension was 67 (Schiötz). There was practically no anterior chamber, the iris being pushed forward by a greatly swollen cataractous lens. The tension was taken after three instillations of holocaine, 1 per cent, at three minute intervals. Then the eye was further anesthetized with cocaine, 5 per cent, and epinephrin, 1:4,000, after which the thermophore with 4.5 mm. contact surface was applied at 135 F. for three and one-half minutes at the upper limbus. As the patient complained of pain, the

treatment was discontinued. The tension was taken immediately and was 58 (Schiötz).

On his return, next day, the patient said that his eye had never been so comfortable in the past four years. The epithelium over the heated area was desquamated, so that tension was not taken; but the eye felt as hard as before the heating. There was slight blanching at the area heated, while the remainder of the eye was rather red and there was swelling of the conjunctiva.

ored, presented himself complaining of failing vision in each eye. Sight began to fail in the left eye ten months previously, and in the right eye within the last two months. The vision was: O. D., 10/250; O. S., P. L. The media were perfectly clear and there was marked cupping of each disc with atrophy of the left. The patient had never had treatment for his eyes except some internal medication. The tension was:

O. D. with 10 gm. wgt., = 65 Schiötz
O. D. with 15 gm. wgt., = 70 Schiötz
O. S. with 10 gm. wgt., = 47 Schiötz
O. S. with 15 gm. wgt., = 45 Schiötz

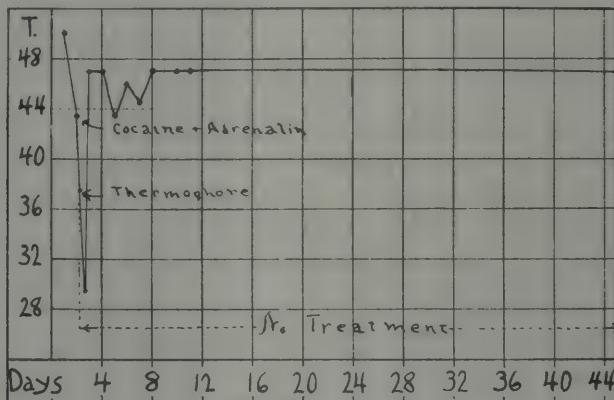


Chart 6 (Case 9, Mrs. G. C., left eye).—This chart illustrates the cases that we must so far class as failures. It was a case of advanced glaucoma with swollen cataractous lens and extremely shallow anterior chamber. There is a rather marked cocaine-epinephrin reaction and a further drop after the thermophore from 43.5 to 29.5, probably a continuation of the cocaine-epinephrin reaction. By the next day the tension had returned to 47, and it remained there day after day. There was, however, no injury to the eye from the thermophore treatment.

The next day most of the reaction had subsided, but tension was 65 (Schiötz).

One week later, the tension still being 65, another heating was done. This time the same contact surface was used, but the temperature was increased to 140 F. and the application to five minutes. No reduction of tension followed.

Two days later the tension was taken for the last time and found to be 57-60 (Schiötz). This was only about 8 points lower than before the first treatment. The patient was lost sight of, and the case must be regarded as a failure.

CASE 2.—Oct. 18, 1919, the day after the first heating of the patient described above, Elijah C., aged 66, col-

October 19, the tension was: O. D., 52; O. S., 46. Application was made astride the limbus in the upper quadrant 4.5 mm. circular contact surface to the left eye (Chart 1). The exposure was for five minutes at 140 F.; cocaine, 5 per cent, combined with epinephrin, 1:4,000, was used freely in the eye before the treatment. The tension immediately after heating was found to be 32, a drop of 14 points. One hour later the tension had risen to 49. The patient experienced no pain during the heating. Pilocarpin, 1/240 grain every three hours, was ordered for the right eye.

The following day the right pupil was contracted to 1.5 mm. (pilocarpin). The left eye showed a gray area where heated. The vessels were not

destroyed, and the corneal epithelium was replaced. The pigment under the area heated was either obliterated or destroyed. There was a moderate amount of general redness and chemosis of the conjunctiva. The pupil was about 4.5 mm. in diameter and was pear shaped, being drawn up toward the point heated. The tension in the right eye averaged 30, and in the left, 25. This was a fall of 21 points in the treated eye. The vision in the right eye had increased to 20/60, and in the left to 1/75 eccentric.

November 7, the tension of the right eye after using holocain, 1 per cent, three times at three minute intervals was:

O. D. with 7.5 gm. wgt., D = 3, T = 36
O. D. with 10 gm. wgt., D = 5, T = 37.5

After this, cocaine, 5 per cent, combined with epinephrin, 1:4,000, was used freely in the eye and 2 minimis were injected subconjunctivally near the limbus. Ten minutes later the tension was again taken and an average was found to be 26.5, a drop of about 10 points.

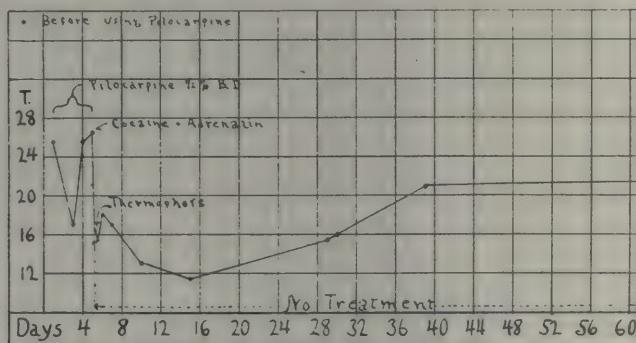


Chart 7 (Case 5, Mr. W. S., left eye).—This case is the only one in which we obtained a visible (the slight) atrophy of the iris opposite the point heated. There is a rather marked cocaine-epinephrin reaction and a period of unusually low tension followed by a slow rise to 21. The rebound was not measured.

A further drop in tension was noted on the next day, O. D. measuring 22 and O. S., 16. The media were perfectly clear.

Pilocarpin was omitted in the right eye for twenty-four hours, and the tension rose to 41. The corresponding tension in the left eye, October 22, was 26. The pupil had almost resumed its normal shape, but still remained slightly drawn up. The eye otherwise was practically normal except for a persistence of the blanching in the heated area and a slight general redness.

For nineteen days after the application the condition remained about as above. The tension in the right eye varied under pilocarpin every three hours from 30 to 37; that in the left, without any treatment, from 16 to 26. No atrophy of the iris was evident. After the initial improvement in vision there was practically no change.

This was a reaction which we had found previously and concerning which our experiments—included later in this article—indicate that the reduction is due to the combination of drugs more than to the action of either one alone.

Then application of thermophore with 4.5 mm. contact surface at 140 F. for five minutes to upper part of sclera bordering on the limbus was made (Chart 2). The patient experienced no pain.

The conjunctiva appeared slightly thinned; the blood vessels were intact; a very small area of the corneal epithelium was touched. After application, holocain, 1 per cent, was used. The tension was then taken and found to be the same as just previous to the treatment.

November 8, both eyes were reported comfortable. The tension in the right eye was 25-26, and in the left eye, 18-21. No pilocarpin had been

used in the preceding twenty-four hours. The right eye showed in every particular the changes previously noted in the left eye. The vision was slightly lowered (from 20/48 to 20/6) for one day, but this soon returned to 20/48.

For two months there was practically no change in either eye. The tension ranged from 17 to 26. No drugs were used in either eye, except holocain on the days when the tension was taken.

Jan. 5, 1920, the patient returned after an absence of one week with a

January 19, the cocaine-epinephrin reaction in the right eye showed a fall from 36 to 30, and an application similar to the one in the left eye was made. The tension immediately afterward was 25.

January 20, the tensions were: O. D., 25; O. S., 14. The usual general ocular reaction was present.

January 21, the tensions were: O. D., 20; O. S., 16. The vision was: O. D., 20/38; O. S., 1/75 eccentric.

February 16, the tension was 22 in each eye.

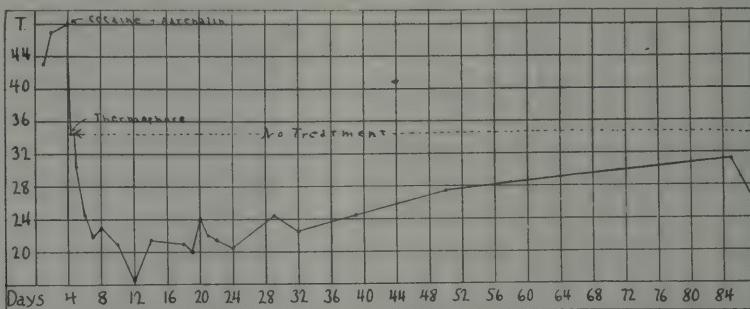


Chart 8 (Case 7, Mrs. P. E. W., right eye).—This patient had had no previous treatment. There is a marked cocaine-epinephrin reaction and a further marked thermophore reaction to a minimum of 16.5 from a maximum of 48; then the usual slow tendency to rise. She will probably require a second application. The rebound was not measured.

tension of 30 in each eye. This rose gradually during the next week to 35, at which time, January 14, the cocaine-epinephrin reaction was tried with no change in tension. The left eye was at once heated to 140 F. for five minutes with 4 by 7 mm. contact surface, adjacent to the area formerly heated.

The tension immediately after heating was:

O. S. with *5.5 gm. wgt., D = 3, T = 25
O. S. with 7.5 gm. wgt., D = 5, T = 26
O. S. with 10 gm. wgt., D = 7.5, T = 25

Pupil O. S., 8 mm. in diameter; pupil O. D., 4.5 mm. in diameter. One hour later the tension O. S. had returned to 36.

January 15, tension O. S. had dropped to 21 and there was a drop in right eye also to 29.

The left pupil was slightly drawn up, and other observations were similar to those noted at the former heating.

January 16, tension O. D. was 39, and O. S., 15.

The visual fields taken from time to time showed no change throughout the treatment.

CLASSIFICATION OF CASES.

Our cases fall into two groups, of which the two foregoing cases are examples, one of each group. In the one group in which the glaucoma is no longer simple—that is to say, in which there is a swollen lens and very shallow anterior chamber, with almost certain obliteration of the filtration angle—the heating produces little, if any, reduction in tension. However, it may be noted that in most of our cases of this sort in which there was an acute attack of pain, the pain was relieved within forty-eight hours by the application.

In the other group are the simple cases which have not progressed to marked secondary changes. In these there is an early fall of tension, usually to nearly normal within forty-

eight hours, followed by a long period—the longest thus far being two and one-half months—of low tension, during which time the patient uses no drugs and has the benefit of a wide pupil. Then there comes a return of increased tension, which has responded readily to a reapplication of heat. How long the tension will remain low after repeated heatings, we do not as yet know. In the rabbit, after four or five heatings the tension remained permanently low. This was a permanent subnormal.

In order to give a comprehensive view of the tonometric history of the cases treated, a series of nine charts is shown. These comprise the most important variations we have observed in the thirty-two eyes treated to date.

ROUTINE PROCEDURE IN PROCURING DATA.

1. Instil holocain, 1 per cent, two or three times.

2. Take tonometric readings.

3. Instil cocaine-epinephrin solution three times at five minute intervals, then inject subconjunctivally about 2 minimis of the cocaine, 5 per cent-epine-

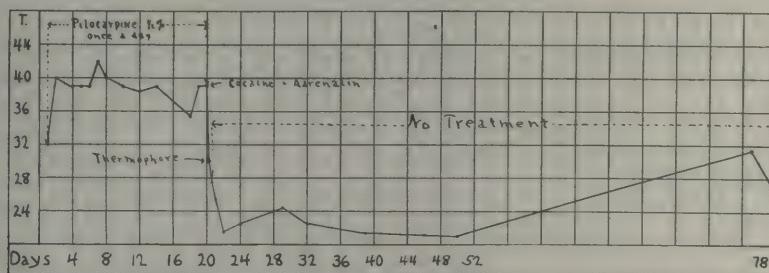


Chart 9 (Case 7).—This shows a rather marked cocaine-epinephrin reaction and a tension level much lower after the thermophore without further treatment than the tension level before the thermophore with rather insufficient instillations of pilocarpin. The rebound was not measured.

A further point of importance is the possibility of reducing the tension to normal when it has been impossible to do this with pilocarpin, 0.5 per cent solution, used as often as every three hours.

Early in our work it seemed wise to test the effect of the drugs which we were using on the tension. We found that epinephrin, 1:4,000, alone, usually caused a rise in tension; cocaine, 5 per cent, alone, produced some fall; but when combined with epinephrin, 1:4,000, it produced in most cases a much more decided fall in tension which lasted about an hour. This fall was not universal and seemed to take place in almost the same type of cases in which the heat application induced a lower tension. In the type of cases with swollen cataractous lenses, the tension was not much reduced; and in one case of glaucoma complicated by an active iritis with adhesions, the tension was further elevated and a severe increase of pain initiated.

phrin, 1:4,000, solution and wait ten minutes.

4. Take tonometric readings.

5. Apply thermophore steadily and constantly held rather firmly against the globe astride the limbus for five minutes at 140 F.

During this application the speculum or lid retractors may be used or the lids may be held away from the conductor with the fingers. If the continuity of the application is interrupted or the contact surface of the conductor shifts its position, the effectiveness of the application will be diminished.

6. Take tonometric readings.

7. Take additional tonometric readings one hour later.

Until we did this we did not know that, following the sharp cocaine-epinephrin fall in tension, there was a rebound carrying the tension up to or above its previous level. We are now engaged in some experiments with cocaine-epinephrin-pilocarpin combina-

tions in the hope of getting an anesthetic that will eliminate this rebound. In all simple cases the rebound has caused no additional pain and has disappeared by the next day. In complicated cases with secondary changes the rebound may cause severe pain.

In all cases all treatment of every kind was stopped after the thermophore application so that no other factor had to be considered on succeeding days.

CONCLUSIONS.

Our technic is not sufficiently finished and our experience does not extend over a long enough time for us to offer this as a better method than the usual medicinal and operative procedures at our disposal.

It is, however, a fascinating study because it appears to be a safe method of experimentation. We do not think that we have done harm in any case, and we feel that it offers marked possibilities in the effective treatment of glaucoma without risk of infection, and with practically no risk of intraocular

hemorrhage. We have not found it necessary in any case to put the patient in the hospital, and in some cases did not find it necessary to bandage the eye.

We are not by any means sure that we have developed the best technic. We are not certain that we are using the best size or shape of contact surface, nor are we certain that a shorter exposure at a higher temperature, or a longer exposure at our present, or a lower temperature, will not produce more permanent results. It may be possible to get a permanent result by using two or three exposures at intervals of two or three weeks.

In short, we have entered a new field, and it will take several years to develop its possibilities and limitations.

We are under great obligations to our senior associate, Dr. A. E. Ewing, for numerous valuable suggestions and constant encouragement, as well as for a large part of the clinical material at our disposal.

VISUAL FATIGUE.

EDWARD JACKSON, M.D.

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This is a discussion of the known and probable changes produced by fatigue, and their possible location. The junction of nerve and muscle through the end plate, and the junction of synapses of the nerve cells are probable locations of fatigue changes. Visual fatigue is essentially different from usual muscle fatigue, and is related rather to activities of the central nervous system. Adaptation is a special form of fatigue fitted to economize effort. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July, 1920. For discussion see p. 133.

The supposed basis of fatigue is exhaustion of prepared cell nutriment, and accumulation of waste products of cell activity; with a probability that the latter process brings a decrease of activity, before the stored nourishment in the cell is nearly exhausted. As regards muscle cells it seems fairly well established that the accumulation of acids, especially carbonic and lactic, is closely associated with diminished responses to stimuli.

The nature of the products accumulated in the nerve cell is not so clear. Crile and Lower¹ found in shock or exhaustion, visible changes under the microscope in nerve and gland cells, in the brain, suprarenals and liver.

The symptoms of general fatigue, slow and feeble motor reactions, blunted perceptions, disagreeable sensations of general weariness, desire to sleep, indisposition to exertion or activity, either muscular or mental, which are familiar to all persons, may be attributable to such changes. But we cannot regard them as necessarily following fatigue of a limited neuro-muscular tract, such as is directly concerned in the act of vision, altho fatigue of such a limited tract may contribute to a general fatigue.

Visual fatigue may contribute to general weariness, but can hardly cause it alone. It may be essentially similar to general exhaustion in the histologic changes on which it rests; but there is a wide gap between our knowledge of chemic and histologic changes; and the clinical manifestations of fatigue that confront us as a practical problem. Even of weariness produced by exertion of the large muscles, as in walking, Barker² says, "Whether this is due to centripetal impulses arising in the muscles themselves, or to a change in the nerve cen-

ters in the central cortex is not certain."

The number of points at which fatigue might occur so as to lower activity or cause sensations of which we are conscious, are thus enumerated by Herrick,³ who bases them on the summary of Stiles." (1) fatigue of muscle fibres, (2) fatigue of the junction of the motor nerve with the muscle fibre at the motor end-plate; (3) fatigue of the nerve-fibres, (4) fatigue of the motor nerve cells; (5) of the synapses between the nerve cells, (6) fatigue of the sense organs and afferent apparatus, (7) fatigue of the centers of voluntary control."

Physiologic experiment shows that the nerve fibres are capable of conducting impulses after the neuro-muscular apparatus has become exhausted and fails to respond to stimulus; and that muscle fibres cease to respond to impulses coming thru the nerve trunk, and yet contract well under direct stimulation. This shows that neither the muscles or the nerve fibre is exhausted.

Stiles⁴ thinks the junction of nerve and muscle is especially likely to give out under continued stimulation. He says: "One is tempted to draw a comparison between the end-plate and the safety fuse such as is used in connection with an electric fixture. The fuse is intended to be destroyed under conditions which might otherwise threaten damage to more valuable portions of the system. It is readily renewed. So we may think of the end-plate as something easily impaired by use, but also easy to repair. It is better that wear and tear should fall upon this structure than upon the more highly organized protoplasm of nerve cells or muscle fibres."

Next in importance as a point especially liable to manifest fatigue, are the

synapses thru which stimulation of motor nerve cells is effected. It is easily conceivable that here a break in the circuit may occur; and that one set of these being out of use, another set can be brought into service under forced effort, made to continue the action. What changes mark physiologic fatigue in the body of the nerve cell, or to what extent it is the seat of fatigue we can only guess. The important point to be here impressed is the large number of structures, any one of which might present essential alterations of fatigue; and our lack of definite knowledge of its location.

Oversuse of the large muscles produces symptoms directly referable to the seat of increased activity, including pain, that arises into consciousness and causes inhibitory impulses that tend to check the use of the muscle. There is pain produced by pressure on the muscle or its tendons; and this soreness or tenderness seems identical with that produced by simple bruise of the part. One symptom of muscle fatigue is local pain due to congestion, but such pain is rarely complained of about the eye. Lippincott⁵ reported localized congestion over the insertion of the internal rectus in three cases. I have seen something of the kind, but very rarely. Patients complain of general soreness "back of the eye," and show decided wincing when the eyeball is pressed back into the orbit. This might indicate soreness in the extraocular muscles deep in the orbit and particularly in their tendons of origin and points of attachment.

But it is characteristic of muscle soreness from oversuse that it is a temporary symptom. One starts to play tennis or to swim at the beginning of the season, or takes a long walk; and after the one day of rather prolonged exercise his muscles feel sore. But if he continues such use of his muscles daily, the soreness will reach its maximum in a very few days; and in two or more weeks will have disappeared entirely. If the beginning of the unaccustomed exercise is quite gradual, and the period gradually lengthened, or when the exercise is habitual no such symptoms will arise. We may suppose that in the case of the eye, habit or more gradual change in the way the eyes are

used, eliminates this symptom of fatigue.

Perhaps the most constant and general symptom of visual fatigue, is a sensation of dryness, roughness, burning, smarting, or feeling of a foreign body in the eye. Children are told the "sandman" is after them and they must go to sleep. These sensations bring to us a fair proportion of patients. Ferree and Rand⁶ have depended largely on the discomfort produced in their experiments on the production of fatigue by various colors and forms of illumination. Some individuals and the members of some families are especially liable to it; but the mass of eye workers can accept such sensations as a fair notice that it is time to stop work. It seems closely connected with hyperemia of the conjunctiva, and might be an expression of weariness in certain parts of the visual apparatus thru lowered vasomotor tone. Failure to heed the warning it gives furnishes cases of chronic conjunctival hyperemia and inflammation, or makes such disease resistant to treatment. Attacks of conjunctivitis due to visual fatigue are common among presbyopes who are deferring the use of the needed help for accommodation.

In this respect we may trace one more analogy between eye and brain. As Weir Mitchell⁷ puts it: "It is only after very long misuse that the brain begins to have means of saying, 'I have done enough': and at this stage the warning comes too often in the shape of some one of the many symptoms which indicate that the organ is already talking with the tongue of disease."

Still more does the eye speak with the "tongue of disease" when it expresses fatigue by eyeache or headache. In the mass of cases these symptoms express the establishment of a pathologic reaction to stimulus; rather than an expression of temporary weariness, that a period of rest will presently remove. Whether in either brain-work or eye-work the aching originates in centripetal impulses, or in exhausted central cells, we do not know. Local influences like pressure on the eye or head may modify pain or relieve it; but this does not throw light on the locality of the morbid action, as it does in

the case of the soreness of muscles and tendons.

The close association of eye and brain symptoms may arise from the fact that the brain, or certain parts of it are using the eye to effect certain purposes. As H. C. Wood says,⁸ "The thinking machine—the brain—works with certain tools. It is clear that, if these tools or instruments be dull or out of order, an enormous loss of power must occur in using them. The most important of these tools of the brain are the special senses. It is of the first importance to have the organs of the special senses in good order." "This process of eye-strain and brain-strain may go on unrecognized for years, until at last the individual is arrested by the giving out of the brain, or by the retinal irritations becoming so severe that vision is no longer endurable." Again the lesson is not recognized until proclaimed by the "tongue of disease."

Whether the aching of some myopic eyes belongs with the eyeaches and headaches of hyperopia; or whether it should be classed with the soreness of the over-worked muscle and congested tendon is somewhat uncertain. Perhaps both kinds of aching contribute to these exceptional cases.

Fatigue of the retina and visual centers is of more importance than all other forms of fatigue connected with vision. We cannot discriminate between that which belongs to the retina and that which belongs to the intracranial neurons of the visual apparatus. Nevertheless we have some definite knowledge about this kind of visual fatigue. In the first place it is attended with lowered visual acuity. This dropping of visual acuity begins very soon after the eyes are brought into use; and it is a phenomenon common to all the eyes we test. We find habitually that a patient with the eye properly focused gets his best vision on first looking at the test card, after a slight period of rest. If he does not utilize it and attempts to decide on doubtful letters by steadily looking at them, he makes more and more mistakes. Often the patient almost says the right letter or quite utters it, and then immediately changes his mind and says something else.

This original maximum of retinal-central resolving power, very quickly drops to a noticeable extent, and then decreases much more slowly, soon reaching a level where little change may be noted for a very long time. Its course is modified by age, by previous exposure to light and by disease. It is closely associated with adaptation—indeed is a phase of the same process. In many patients decidedly better vision can be obtained even by the best daylight, after they have been kept several minutes in the dark room, or in a dimly lighted reception room. This is particularly the case with patients who have retinal deterioration with high myopia or other intraocular disease. This latter fact points strongly to the retinal nature of this form of fatigue. But it is not established definitely enough, or sufficiently supported by experiment or special observation to settle the point completely. It may be agreed that this manifestation of fatigue is partly or sometimes retinal, but it is not established that it is always or wholly retinal.

Closely related to the matter of lowered visual acuity is the fatigue significance of after images. These have received some attention in the literature, altho not as much as their practical importance warrants. In all our visual and especially our accurate color testing, and testing of night vision, more attention must be paid to the matter of adaptation, the elimination of after images of all objects previously looked at.

Another point about retinal-central fatigue is that it is increased by great difference in the intensity of stimulus to which adjoining parts of the retina are subjected. This disagreeable effect of looking at a bright light against a dark background is familiar to all of us, and is a common cause of complaint by patients. Clearly such contrasts are fatiguing, and must be reduced to a minimum compatible with the required use of the eyes. This phase of fatigue is of all the greater importance, because the resolving power of the eye depends on sharpness of contrast.

Our reading of black letters on a white ground is an instance of this application

of resolving power. The sharper the contrast the farther away the letters can be recognized; but the greater the fatigue if the reading is continued. Here as elsewhere a compromise, or medium adjustment of contrast must be sought which will give the optimum of efficiency for the eyes. Brightness of illumination of the page, color of the background and general illumination of the room in which reading is to be done, all have to be considered. There is need for systematic observation with regard to all these factors, in general; and also with reference to the particular patient to be considered.

Finally we have to consider fatigue of coordination; for the visual act is extremely complex—is only complete by the coordination of many separate physiologic processes. This kind of fatigue arises somewhere in the central nervous system. We do not know exactly where, but the synapses of the neurons may be assumed as a probable location. The stimuli for each of the six muscles of each eye must be coordinated with each other, and with the sensory impressions on the retina, in order that the eye shall be turned in the desired direction. The stimuli to the muscles of the two eyes have to be coordinated for binocular vision. The sensory impressions have to be coordinated with each other and with visual memories. This makes an extremely extensive and elaborate system of coordination, beside which the most complicated telephone switch board must seem simplicity itself.

Probably the usually recognized signs of eye weariness are fatigue of coordination. When paresis of one or more ocular muscles arises, the strain to coordinate under such a handicap quickly causes headache, vertigo, nausea, abandonment of binocular vision. The lack of correspondence of the images obtained

thru new glasses, with the visual memories of the patient, causes the distortion of perspective and judgment; and the ensuing annoyance of fatigue, that patients complain of so bitterly when oblique cylinders or lenses of unequal strength are prescribed to correct their ametropia. Even the fatigue of good eyes for ordinary near work must be largely a matter of fatigue of coordination. In my own case, the effort of keeping up binocular fixation and avoiding diplopia, with the necessary accommodation for reading, when getting drowsy, comes nearer to the effort of completing a long walk or mountain climb, than anything else my eyes have to do.

Some realization of the importance of this fatigue of coordination should give a better balanced judgment as to the adoption of therapeutic measures for the relief of eyestrain. The problems of visual fatigue are important, timely, practical problems, to which the recent advances of our knowledge of physiology, with carefully devised methods of experiment can be applied with great prospect of achieving results of value.

Some analysis of the different forms of such fatigue, an attempt to localize the essential change that gives rise to fatigue, and a recognition of the extremely important part that efforts of coordination play in producing fatigue, ought to be useful in giving us a better conception of a condition that passes easily from physiologic to pathologic significance.

It should be borne in mind that normal visual fatigue rarely rises into consciousness. Only when the organism in response to long continued or repeated excessive fatigue has developed a method of translating this into discomfort or pain, does it develop into symptoms that bring patients to us for relief.

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NOTES, CASES AND INSTRUMENTS

PARALYSIS OF THE EYE MUSCLE AFTER ALCOHOLIC INJECTIONS FOR TRIGEMINAL NEURALGIA.

DR. J. FEJER,

BUDAPEST, HUNGARY.

It is a well known fact that surgeons and neurologists often perform in the case of trigeminal neuralgia alcoholic injections. Often this proves very successful, for the alcohol getting into the vicinity of the above mentioned nerve, produces a perineuritis, or a chemical necrosis; in short, it calls forth an anesthesia in the nervous cord and the pain ceases. But sometimes the way of the alcohol jet is not calculated precisely enough, it gets near another nerve and annihilates its function.

In my practice I had two such cases, in the first it was the nervus abducens, in the second the nervus oculomotorius which has been paralyzed by the alcoholic injection. My cases are in brief report as follows:

1. A lady of about fifty years calls upon me with the complaint that for the last few days she sees everything double. The patient is very short-sighted, the mobility of the right eyeball is checked in lateral direction. She relates that more than once she has been injected with alcohol in consequence of neuralgia trigemini, and her state grew better in some degree. After the last injection, however, which she got in the region of the right malar bone, under the right inferior eyelid, her eyelids swelled up intensely and a week later paralysis became manifest. The internal use of Sajodin ameliorated her state very much, the double image disappeared.

2. My second case was that of a woman of about 32, who, having suffered from stinging pains in the region of the left supraorbital notch some months ago, received an injection in that part. Her eyelids became swollen for months afterwards. After the retrogression it appeared that the patient could but scarcely move her su-

perior eyelid, the mobility of the left eyeball was checked both upwards and downwards, the capacity of accommodation weakened; in a word, only the musculi internus, externus and obliquus are active, of all the eye muscles. The left pupil is larger, rigid and does not respond to the light reflex. Both eyes are subject to hypermetropic astigmatism. The eyeground is intact. This state has continued for the last year and there are no signs to indicate any amelioration.

Both my cases prove that the alcoholic injection in the region of the eyeball is by no means so free from danger as Prof. Pichler maintains it in his last paper. Cases of atrophy of the nerves are described already in the literature (Koennicke). Keratitis neuroparalytica has been noted after such injection in many cases. Therefore, let us be extremely careful with this indication. The selection of the technical method, too, ought to be effected with the utmost deliberation.

FLUOROSCOPY FOR OCULAR FOREIGN BODIES.

W. S. FRANKLIN, M.D., F.A.C.S.

F. C. CORDES, A.B.M.D.

W. D. HORNER, B.S.M.D.

SAN FRANCISCO, CAL.

The removal of foreign bodies from the orbit and globe has fortunately been greatly simplified by X-ray localization. Certain cases occur, however, where either through the localizing method employed, or faulty technic, the foreign body is found elsewhere than the point designated by the radiographer.

A distance of only a few millimeters is of the utmost importance at times in differentiating between an intraocular and an extraocular foreign body. In one of our cases a foreign body was localized just external to the globe, whereas ophthalmoscopy showed it lodged in the retina. An accurate localizing method and careful technic cannot be too strongly emphasized.

The improved Sweet localizer is said to be accurate to a fraction of a millimeter in an eye of normal dimensions, i. e., assuming 24 mm. to be the average diameter. In eyes with high degrees of hyperopia or myopia, the diameters will, of course, vary widely from this. In a myopic eye measuring 27 mm. an intraocular foreign body computed for the average diameter (24 mm.) might be diagnosed as extraocular. Conversely, in a hyperopic eye measuring 21 mm. an extraocular foreign body might be erroneously located as intraocular. Thus between a high myopia and hyperopia the diameters might easily vary 6 mm. or more.

Where the foreign body is not acted upon by a magnet, as glass, copper or aluminum, removal is made more difficult, and surgical exploration must be resorted to. In this type of case, or where there is doubt as to the exact location of the body, a most useful adjunct to the usual localization is the fluoroscope; assuming, however, that the foreign body is large enough to be readily seen under the screen.

The following case which came under our care, is briefly reviewed as an example:

Mr. W., age 38, was referred to us by his internist for eye examination. He complained of severe neuralgic pains in the temples and right side of the face. There was also a history of additional pain, at times, in his legs and right side. One and one half months previous, a rhinologist had opened and drained the right antrum.

The general physical examination was reported negative. During a recent X-ray examination for possible peridental abscesses, a foreign body had been discovered in the right orbit. Localization made by the Sweet method gave its position as 3 mm. to the nasal side, 13 mm. above and 9 mm. behind the center of the cornea.

The patient had insisted upon the removal of the foreign body, and was referred to us for that purpose.

Vision proved to be 0.8 in each eye, and the fundi, fields and tension were normal. Removal of the foreign body

was decided upon and the patient entered the University Hospital.

A supraorbital incision was thought advisable, as the body lay apparently above the globe. Careful exploration, however, failed to locate it. Having witnessed Dr. Saxton Pope, of our Surgical Staff, remove a nail from a child's lung by means of the fluoroscope, we decided to apply this method to the case at hand.

The supraorbital incision was covered by a sterile dressing and the patient, still anesthetized, was removed to the X-ray room and placed upon the fluoroscopy table. Under surgical precautions, and directed by the screen a probe was introduced into the wound, and the relation of its tip to the foreign body noted. The bulbar conjunctiva was then grasped near the limbus and the globe moved in various directions. The foreign body was seen to move with the eye. It also moved when traction was made on the loose tissues of the lid. These observations made us conclude that the foreign body was either lodged in the sclera or episcleral tissue and that it lay nearer the nasal side than was shown in the X-ray.

The patient was returned to the operating room. With its relations in mind, the foreign body was located and removed without further difficulty thru a conjunctival incision. The body measured 9 by 2 by 2 mm. and was a spicule of iron.

Subsequent history developed the interesting fact that fifteen years before, when "shearing" metal, a piece had struck the patient over the right eye but it had been treated as a minor superficial wound and he had entirely forgotten about it.

Fluoroscopy offers an additional aid in the location and removal of ocular foreign bodies in a certain percentage of special cases.

A CASE OF BILATERAL PULSATING EXOPHTHALMOS.

GEORGE W. SWIFT, M.D.
SEATTLE, WASHINGTON.

Mr. G. G., age 23, was injured at Thayne, Alaska, on October 17, 1919, in the following manner. While coupling two ore cars his head was crushed

between the two cars. He was taken to the hospital in an unconscious condition where he remained for three weeks, and was then transferred to the Seattle General Hospital.

At that time the examination was as follows: Mentality clear. *Eyes*—A marked exophthalmos both right and left; eyes straight forward; ptosis of both upper lids; both eye balls were fixed and slightly divergent. Protruding between the lids of both eyes was a large edematous fold of conjunctiva 1 cm. wide with slight necrosis of the superficial layers. Both corneae were slightly hazy at the lower margin in the central region. A sticky secretion covered both corneae and conjunctivae, but no organisms were present in the smears. Both corneae were insensitive. Both pupils were dilated and fixed.

Ophthalmoscopic examination revealed a marked whiteness of both optic discs; the arteries and veins were tortuous and markedly distended; areas of white exudate covered the vessels, especially in the region of the disc and macula; small hemorrhages appeared everywhere in the retina.

On palpation a distinct pulsation could be felt from both the eyes. With the stethoscope a distinct bruit could be heard over both temples of about equal intensity; the bruit could be heard as far back as the posterior border of the zygoma while in the midline of the forehead a very faint bruit was heard. The face on both sides was insensitive to touch; and both sides of the face were paralyzed. There was a mucous discharge from both ears and a serous discharge from both nares. A roentgenogram revealed no evidence of fracture of the skull.

The diagnosis of a double pulsating exophthalmos at that time was made with the following cranial nerve involvements: right and left 2nd, 3rd, 4th, 5th, 6th and 7th nerves. The vision at this time was fingers at 6 feet, in both eyes; an effort was made to protect the cornea by keeping the cornea and conjunctiva covered with sterile vaselin, but on December first it was necessary to remove the folds of conjunctiva in order to save the cornea.

On December 4th a marked change had taken place. Previous to this time ligation had not been considered advisable because we were unable to determine which side seemed to be the most favorable for operation. The examination on December 4th showed a sudden increase in the extent of the bruit on the right side. Whereas before the outward limitation was at the posterior border of the zygoma, it could now be heard back of the mastoid region. The patient complained of a dull throbbing of the head on the right side; the right face showed a slight edema and it was decided to ligate the right internal carotid. This was done by Drs. Plummer and Eagleson the following day. After recovery from the anesthetic the patient remarked that the throbbing had stopped. There were no cerebral symptoms following the operation, and recovery has been uneventful since.

RESULT. The recovery in this case is of interest. The right eye which before ligation showed more changes than the left, now rapidly became the better eye of the two, notwithstanding the fact that there were more corneal involvement in the right than the left. The optic disc gradually receded until now a delicate haze alone remains; while the vision is 3/10 with an astigmatic correction lens. The third nerve is now practically normal while the sixth nerve is still paralyzed. The anesthesia of the cornea still remains but the sensation has returned to the entire right face. The facial muscle is beginning to show signs of repair. He can now close his jaws and elevate his right lip. The bruit has not been heard since the ligation and the eye has receded to its normal position.

On the left side the vision is now fingers at 6 feet (apparently no change), the disc is still blurred and the eye is still slightly prominent but apparently is receding somewhat. Sensation is absent over the distribution of the inferior branch of the fifth nerve only. The fourth and sixth nerves are still paralyzed, but there has been a marked improvement in the condition of the third, altho the eye cannot be moved to any extent. The seventh is normal. The ear

drums have healed, and the hearing is practically normal, altho a little less in the left than in the right.

SUMMARY: Pulsating exophthalmos of both sides with involvement of the second, third, fourth, ophthalmic division of the fifth, the sixth and seventh nerves on both sides, was the immediate result of injury. Evidently edema and possibly some hemorrhage accounted for the lesion of the other branches of the fifth. (2) An enlargement of the aneurysm on

the right side as shown by the subjective symptoms and the objective signs. (3) Ligation was not accompanied by any shock to the patient, and resulted in marked improvement. (4) The repair of the cranial nerves has been in line with their involvements; the last involved being the first to repair. (5) On the left side where no ligation was performed, a moderate degree of improvement has taken place, altho not to be compared to the improvement of the right side.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY, COL- LEGE OF PHYSICIANS OF PHILADELPHIA.

October 21, 1920.

DR. G. ORAM RING, CHAIRMAN.

Orbital Sacoma Treated with Radium

DR. HOWARD F. HANSELL exhibited a case of tumor of the orbit, probably sarcoma, of two years' duration. The patient had been treated by X-rays for one year and for the last six months by radium. The only benefit of the treatment has been to prevent rapid growth. The treatment will be continued and operation postponed until the last moment.

Perforation of Globe by Particle of Dynamite Cap.

DR. BURTON CHANCE described, briefly, a case, and exhibited the eyeball which he had excised from the orbit of a Polish boy of five or six years, who recently, while striking a dynamite cap between two stones, was wounded in his left eye. The history of the interval between the wounding and his admission to the Wills Hospital, early in October, is not obtained, as the child's family could not speak English. When admitted, the orbital base was depressed, the fissure contracted, the globe somewhat shrunken. There were no scars, perceptible, on the globe. The cornea was clear; the anterior chamber of unequal depths; the iris bright green. No reflex was obtained from the fundus. At the enucleation the superficial tissues were densely adherent to the globe, especially over the nasal aspect. The nerve was cut without difficulty, but on attempting to deliver the globe it was found to be held fast deep in the apex. After many efforts, during which it seemed as tho one had to do with a neoplasm, the globe was finally delivered. The tissues were prolonged about 8 mm. very much as in the manner of a protruding growth. At the apex of the more or

less triangular mass pus oozed on pressure. On section of the globe and mass a bent copper cap was found in the pocket containing the pus. The globe was more or less quadrate; no positive cicatrix could be seen, but the muscles and orbital tissues had been lacerated and were massed together in the posterior nasal aspect without including the nerve. The almost globular crystalline lens had been dislocated and the choroid and retina detached and shrunken. The child made a good recovery.

Effects of Carbon Monoxid.

DR. W. H. WILMER, of Washington, D. C., by invitation, read the paper published in full on p. 73. The paper dealt with:

1. The frequency of exposure to carbon monoxid gas in all walks of life, domestic and industrial.
2. The voluminous general literature upon the subject, but the dearth of any detailed descriptions of the ocular lesions.
3. Its combination in the blood. Two opposing theories concerning its deleterious action upon the body tissues; by depriving the blood of its oxygen-carrying properties; or by a direct chemic action upon the delicate central nervous tissue.
4. The pathologic changes found in the central nervous system of fatal cases consist of great congestion of the vital organs; in the nervous system, inflammation, thrombi, hemorrhages, fatty degenerations and atrophic changes.
5. A detailed account of the chronic poisoning by the gas from a faulty hot air furnace of an entire household over a period of two months. Special note of the hallucinations of vision, hearing and touch.
6. A report of the case of one of the children (four years old at the time of exposure) who suffered from a double optic perineuritis.

7. The report of a case of a man of thirty-five years of age whose optic atrophy was due to carbonic oxid from the fumes of a gasoline torch.

The paper closed with the following conclusions:

The exposure in modern life to the influence of carbon monoxid introduces an additional cause of eye lesions. As carbon monoxid is present in all of the gases connected with domestic and industrial activities, possibly it has been responsible for certain obscure amblyopias that have been attributed to other chemical substances. Its causal relation may be obscured at times by some other very evident source of toxemia, such as septic tonsils, apical abscesses, syphilis, etc.

It is not of vital importance to the ophthalmologist whether carbon monoxid manifests its serious effects as a distinct chemic poison, or whether it deals destruction purely by its power of quickly depriving the blood of its essential oxygen-carrying power. But it seems to the writer, after much experience with pure oxygen want, artificially produced, that there is much truth in the two opposing theories. On the one hand, the physiologist sees the dramatic effect of carbon monoxid upon the person who takes one whiff of the concentrated gas and falls as if electrocuted; or he is interested in those cases which finally become unconscious after a longer exposure to fumes of lesser strength. Moreover, he sees the results of experimentation in the laboratory, and he is quite rightly impressed by the effect of this gas upon the oxygenation of the blood. But he does not come in contact with the final consequences of the prolonged, but intermittent, exposures to infinitesimal doses of this gas—results which are of such interest to the clinician. In these cases, the symptoms run the gamut of clinical medicine.

The history of carbon monoxid convinces one that, apart from the effect upon the hemoglobin, it is chemically inert compared with the toxicity of other well-known chemic substances. However, one cannot but feel that after a prolonged attack upon the body tis-

sues, it exerts a deleterious influence which is apart from its purely oxygen-depletion effect—tho the latter does sensitize the delicate structure of the central nervous system.

Carbon monoxid does not show any great predilection for the optic nerve fibers as a whole, nor even for the very sensitive papillomacular bundle which is so markedly affected by alcohol, nicotine, etc. The ocular nerve lesions seem to be due to changes in the delicate structures of the nuclei of origin of these nerves.

However, thru its effect upon the sensitive fabric of the central nervous system, carbon monoxid does cause ocular paralyses, hemianopsias, disturbances of pupillary reactions, optic neuritis, and, actually, optic atrophy. Like pure asphyxiation, it is the source of great ocular congestion, and in this way it does cause subconjunctival and retinal hemorrhages; while in the milder cases of carbon monoxid poisoning congestion of the respective cerebral centers causes hallucinations of vision, hearing and touch.

The writer feels that the first case reported is one of optic neuritis due entirely to carbon monoxid poisoning. This seems to be a logical conclusion to draw from the history of the case, the great general disturbance, the very slow recovery, the elimination of every other toxic source, and the recognized susceptibility of children to this gas.

In the second case, carbon monoxid is the probable cause of the optic atrophy, by reason of the very clear history of ocular and other disturbances that followed each exposure to its fumes, and the exclusion of all other toxic sources.

The treatment seems to resolve itself into remedies suggested by the symptoms, prophylaxis, hygiene, and the legislation that should follow the proper education of the public in regard to the insidious toxicity of this "Frankenstein" of advanced civilization.

DISCUSSION—DR. H. A. HARE spoke of the relationship of carbon monoxid and illuminating gas, fuel gas and coal gas.

In all cases of gas-poisoning carbon monoxid seems to be the chief factor but in very few instances is it the only gas which is responsible for the symptoms, the chemical composition varying with the coal used, and the temperature employed in generating the gas. The point is whether it is coal gas or illuminating gas, commonly called water gas. Water gas contains a much higher percentage of carbon monoxid than does the gas made from coal. Thus Professor Remsen put the percentage of carbon monoxid in coal gas at 7.9 and in water gas 28.25.

He spoke of the greater affinity of carbon monoxid for hemoglobin than has oxygen, and referred to the article in Witthaus' Medical Jurisprudence and Toxicology, Vol. iv, that states that in some cases of survival certain disturbances, notably those of the nervous system, persist for months or years, due to hemorrhages and softening caused by the impoverished condition of the blood, but more usually the patient recovers completely in the course of a few days.

After describing the symptoms in general, consisting of loss of muscular power and unconsciousness, he adds that vision is impaired during recovery and in some cases there is deafness. So, too, Herold states that vision is disturbed.

Further on Witthaus states that a very characteristic lesion in prolonged carbon monoxid poisoning is the occurrence of hemorrhages and softening in the cortex and central nuclei of the brain, notably in the two internal segments of the lenticular nucleus. These lesions are frequently symmetric and due to degenerative changes in the coats of the arteries.

He then gives about a dozen references, all of which are to German literature, as justification for this statement on his part.

It is interesting in connection with the statement made above concerning lesions of the lenticular nucleus, to note that the distal group of vessels coming off of the circle of Willis or the lenticulostriate arteries send branches to the outer segment of the lenticular nucleus

and that the lenticulooptic arteries pass to the outer and posterior parts of the lenticular nucleus and the outer part of the optic thalamus.

In this country, Dr. Dana of New York, while dealing with another aspect of nervous lesions, has contributed information of interest in this connection. Thus, he has pointed out that it is very common, if not almost universal, to find as an effect of gas poisoning, a softening of both lenticular nuclei if the patient has been unconscious from the effects of the gas for more than twenty-four hours. He quotes Ziemssen as having reported a case of gas-poisoning with softening of the corpus striatum in 1864, while Simon reported that gas-poisoning caused thromboses and softening of the brain, particularly of the lenticular optic region, in 1868. Thus, in a case of gas-poisoning in a woman aged forty-six years, the autopsy showed in the left side of the brain a spot of softening the size of a cherry in the middle of the corpus striatum which at the limit of the thalamus behind was more solid. A similar but smaller lesion was in the right striatum, with no other spots of softening.

To quote Dana: "In 1898, Kolisko published a series of articles upon the bloodvessels of the brain. In this he particularly called attention to the existence of a special artery which is given off from the anterior cerebral, near the communicating branch. This artery is usually single, but sometimes double. It runs upward and backward, and it supplies the caudate nucleus, part of the anterior portion of the internal capsule, and part of the outer portion of the lenticular nucleus. Owing to the length and peculiar direction of this artery, the blood that passes into it has to flow rather against the normal current. The result is that the pressure in this artery easily becomes relatively less than that of the other vessels, and when the general blood pressure is very low, as in gas-poisoning, a tendency to stasis and thrombosis occurs. This artery is the one, then, that is particularly selected as that in which thromboses occur, and Kolisko states that it

has as much right to the name of "the artery of cerebral thrombosis" as the branch from the middle cerebral has to the name of the "artery of cerebral hemorrhage." It is an involvement of this artery on each side which occurs in cases of gas-poisoning, and which leads to the very common lesion of bilateral softening of the corpora striata in that condition."

Dana also quotes Klebs as reporting a case of softening of the corpus striatum with a sharply limited focus and two others with lesions in the inner parts of the lenticular nucleus and anterior part of the internal capsule.

Dana expresses the belief that it is well known that the most common and practically uniform lesion in gas-poisoning is that of the lenticular nucleus.

Finally, it is interesting to note the statement of Dr. Marshall, who is the physician employed by the United Gas Improvement Company, as to whether visual disturbances are met with in those employees who are exposed to gas fumes. Naturally, the experience of Dr. Marshall is a very wide one, and he said that he does not recollect a single instance where disturbance of vision was noteworthy.

DR. F. X. DERCUM said it was not surprising that in lethal cases lesions have been found in the basal ganglia and capsules, as this region is the favorite seat of vascular crises of all kinds and from whatever cause. This fact is due to the preponderating role which the middle cerebral artery and the branches which enter the anterior perforated space play in the vascular supply of the brain. Gross hemiplegias are met with in such cases, and that characteristic lesions are found at autopsy is not surprising. The lesions are, however, not limited to these regions. This is indeed indicated by the symptoms, which vary greatly. Palsies, gross in character, hemiplegias, local palsies of one or more limbs, and even paraplegias, have been described. The palsy may be flaccid or spastic; there may be fibrillary contractions, tremor, muscular twitchings and muscular spasms irregularly recurring or persistent. Finally, there may be convulsions. Cases with

gross lesions usually die and autopsies reveal hemorrhages into membranes and nerve tissues, foci of softening due to thrombosis, degeneration of nerve cells and fibers, chromatolysis, atrophy. The facts suggest the action of a toxin—possibly of a secondary toxemia—on the vessel walls. In cases that survive symptom-groups leading to the diagnosis of multiple cerebrospinal sclerosis may make their appearance. Probably we have here to deal with multiple foci, multiple small lesions, primarily vascular. A more frequent clinical picture is that of a multiple neuritis and it is this which in the light of Dr. Wilmer's interesting paper especially concerns us. Many such cases have been described, especially by French writers, and for reasons to which Dr. Wilmer has alluded. It is worthy of special note that the neuritis is usually not diffuse, but localized; indeed, when a diffuse multiple neuritis is present, it is quite legitimate to think of a possible and preexisting alcoholism. Most frequently the picture of a neuritis caused by carbon monoxide poisoning is that of a neuritis of one or more nerves of a single extremity. It would appear, also, from the observations of various writers, for example, Claude, who has especially studied this question, that the neuritis is not primary but is secondary to lesions of nerve centers a conclusion parallel to that of Dr. Wilmer for the neuritis of the optic nerve. The peripheral neuritis, when present, appears to be the outcome of lesions of membranes, hemorrhages or softenings in the nerve centers, or possibly to edema of contiguous tissues leading to compression.

Far more common, however, than organic changes, are the conditions which suggest a functional disturbance of the nervous system, which are not infrequently overlooked. Doubtless these are toxic in their origin, but whether due merely to the interference with the oxidation of the tissues caused by the carbon monoxide inhalation or to a secondary intoxication, it is impossible to say; more probably to the latter. Dr. Wilmer has already graphically described the symptoms which such cases

present. In brief they are featured by headache, backache, vertigo, tinnitus, weakness, atonic indigestion, impaired circulation, sleep disturbances. In individual cases, given symptoms may be especially pronounced. At times, too, as Dr. Wilmer has recounted, mental symptoms may be prominent and striking. There may be mental depression, irritability, impairment of memory, hebetude, apathy, marked mental impairment, confusion, hallucinations. At times a loss of memory is present suggesting a lacunar loss, in which the lacunae are filled in spontaneously and automatically from the subconscious mental content so that the picture of fabrication as seen in Korsakow's psychosis—itself a mental disorder frequently associated with polyneuritis—is simulated.

To Dr. Dercum it seemed that the socalled functional symptom-groups are practically of the utmost importance. They suggest toxemia plus exhaustion. Finally, we must be careful to differentiate such cases from the hysterias that are occasionally found in cases that have been exposed to gas-poisoning. Here the picture is that of palsies, contractures, or other motor phenomena, associated with typical hemi- and segmental anesthesias; and other crass hysterical phenomena. Clearly such cases are to be referred to mental shock and fright, just as are cases of socalled traumatic hysteria, and not directly to carbon monoxid poisoning. In conclusion, Dr. Dercum wished to emphasize the fact of our indebtedness to Dr. Wilmer for bringing before us such an important subject and in such a valuable paper.

DR. DE SCHWEINITZ congratulated Dr. Wilmer on his interesting and timely paper, which he deemed especially important in that it forcefully called the attention of ophthalmologists to the ever-present dangers of carbon monoxid poisoning, so often insidiously conveyed, and therefore all the more deadly. These dangers have frequently been studied and reported upon by physiologists, chemists, neurologists, and those interested in industrial medicine, but the ocular symptoms have not

received the attention which is their due. In many respects the gathered information on this subject, that is, carbon monoxid poisoning, is most satisfactorily compiled up to 1914, in Glais-ton and Logan's work on "Gas Poisoning in Mining and Other Industries," and contains a good résumé of the ocular symptoms, and in this city we are indebted to Spiller and McConnell for an excellent study from the neurologic and pathologic standpoints.

Dr. Wilmer has so well summarized the eye symptoms thus far recorded, as well as those he has observed, that there is little to add. Not the least interesting pupil phenomenon in acute carbon monoxid poisoning is the occasional development of an exaggerated hippus; nystagmus, for example, in those exposed to mine gases, is important because it would seem from recent investigations that miners' nystagmus, usually attributed to the strain caused by deficient light, or to muscle fatigue, or to insufficiency of fusion power, may be the result of a form of carbon monoxid poisoning. The optic nerve changes which Dr. Wilmer observed in one of his patients and in one under the care of Dr. Burke are a further confirmation of the fact that the damage may be a permanent one, as it was in the report of Brose, who found atrophic pallor in men exposed to the gases developed by the explosion of dynamite, and in that of R. Pirrie, who noted permanent optic nerve atrophy in two patients exposed to the fumes following nitroglycerin gas blasting; in all of these instances it was believed that CO might be the responsible agent, altho some other gas or vapor was not entirely excluded. That the hemianopsia of carbon monoxid poisoning is due to hemorrhages or areas of softening in some portion of the visual pathways seems well established, as pathologic investigations have demonstrated fatty degeneration in the intima of the vessels in the central nervous system. The bilateral softening of the lenticular nuclei in fatal cases of carbon monoxid poisoning, to which Dr. Wilmer has referred, first described in this country by Dana, is

well shown in an illustration from Spiller and McConnell's article, and is a frequent and almost characteristic lesion, altho not with reference to hemianopia. To what extent the ocular phenomena produced by this gas are due to its powers of reducing the oxygen-carrying power of the blood is not apparently known, and yet if Yarrow's contention (quoted by Dr. Wilmer) is correct, that the blood impregnated with this gas loses its power as an oxygen-carrier to the tissues of the body, it may well be accused in this respect. From all standpoints, and therefore, from an ocular one, it is well to remember that persons exposed to the influence of CO may apparently recover entirely, the recovery to be followed by the symptoms of the poisoning, or, in other words, a delayed reaction.

A practical lesson from Dr. Wilmer's paper evidently is that in the investigation of certain obscure optic nerve troubles and muscle palsies and certain types of unexplained visual field amblyopias, the possible relation of a slow and insidious carbon monoxide poisoning must not be neglected, nor must it be forgotten in attempting to explain, not only visual hallucinations, but so-called colored vision, for example, xanthopsia, which Hilbert has noted exactly as it occurs in santonin poisoning, and sometimes in other varieties of toxic amblyopia.

DR. HOWARD F. HANSELL said that Dr. Wilmer had done this community a real service in calling attention so emphatically to the danger to which we are all exposed either in the home or in the factory—to the danger of poisoning by carbon monoxid. He personally felt under deep obligation and would endeavor to profit by these thoughtful suggestions. Dr. Hansell had never knowingly seen a case, but he believed with Dr. Dercum that we pass many cases by without recognition. There is thus far no syndrome of ocular symptoms. The ophthalmologists who have written on the subject have described not more than one or two symptoms. The eye complications; paresis of the extraocular and intraocular muscles; disturbance of vision; concentric con-

traction of fields; double homonoyous hemianopsia; mydriasis, miosis and paradoxic pupillary reactions; protrusion of the globe and nystagmus have been mentioned. The eyegrounds are usually negative, altho venous hyperemia of the retina and exudation into the retina adjacent to the nerve have been reported. In addition, functional derangements may be attributed to the gas in those who are subjects of poisoning.

DR. L. C. PETER wished to add his vote of appreciation to Dr. Wilmer for his very interesting communication just read. The cases which he presented were of very great interest. Three phases of the case in which the visual fields were presented should receive special consideration. First, the total absence of gross fundus changes visible with the ophthalmoscope. In retrobulbar types of optic neuritis it is the rule to find no gross fundus changes. This case, however, covered a period of about two years, during which he was under observation, and the fields even now show considerable pathology. One would, therefore, expect to find some fundus changes.

Second, the papillomacular bundle is the first to show evidence of disease in toxic types of amblyopia; in this case the macula apparently escaped.

The third interesting point is the enlargement of the blind spots of Mariotte. Dr. Peter had been in the habit of calling the attention of the student body in the classification of optic neuritis to this particular type, which as a rule is rare, namely, a perineuritis giving rise to an enlargement of the blind spot. This patient is a concrete example of this rather unusual type of neuritis.

The fields, as presented by Dr. Wilmer, as of very great value not only from a diagnosis standpoint but from the standpoint of prognosis as well. Without involvement of the papillomacular bundle one would expect that the patient should make a fairly good recovery with little demonstrable damage to vision.

DR. EDWARD A. SHUMWAY said that

he wished to place on record a case of carbon monoxid poisoning, which he had seen at the University Hospital Eye Dispensary in May, 1918. The patient was a child, aged six months, of Jewish parentage, who had been in good health until three months of age, when the family were overcome during the night by coal gas from a defective heater. Their physician, who had been called in, found the older children vomiting, and the baby in a stupor, from which it was aroused after a few hours. Following this, the child had been unable to hold its head up, sit up, or use the lower limbs. Examination at the dispensary showed the child to be apparently blind and deaf. There was no response of the pupils to light. Eyeground examination showed suspicious pallor of the discs, and special attention was paid to the macular region, for the possible presence of a cherry red spot, to exclude amaurotic family idiocy as the true condition, but none was found, nor did it appear later, nor did the nerves become atrophic.

Dr. Spiller had examined the child, and had made a diagnosis of cerebral diplegia, probably due to carbon monoxid poisoning. The child has been seen at intervals since 1918, and while there was some improvement in muscular movements, there was permanent blindness and deafness. At no time, however, had there been any spasticity of the affected limbs, which was frequently found in cases of degeneration of the lenticular nucleus, and had been a notable feature in S. A. K. Wilson's cases of progressive degeneration of the lenticular nucleus of the family form.

J. MILTON GRISCOM, M.D.,
Clerk.

COLORADO CONGRESS OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

DR. MEYER WIENER, of St. Louis,
Presiding.

Friday, July 23, 1920.

(Continued from p. 886, v. 3, 1920.)

Visual Fatigue.

DR. EDWARD JACKSON, Denver, read the paper published in full, page 119.

DISCUSSION. DR. R. S. LAMB, Washington. This is a subject which has interested me tremendously, because from my viewpoint the local fatigue is often an expression of the general fatigue of the individual; but is manifest in the eye because of the fact that the eye is used more than any part of the body. As described by Dr. Jackson the process is quite complicated.

The natural tendency of fatigue is to shut down certain processes of activity, and in consequence there comes venous congestion. A congestion of the conjunctiva which is manifest by a gritty sensation, and is easily discovered by looking at the eye. In all likelihood there is a congestion of the veins of the ciliary body and processes, which has an influence on their secretion, if our theory is correct in regard to the manner in which the aqueous humor is secreted. Coincidentally, almost invariably, you may have asthenopia; which is due to the congestion having been more or less chronic, or having occurred over a long period of time. These are the cases in which turning the eyes from side to side or vertically one gets the subjective symptoms of pain. We know this is particularly vexatious and inhibiting to the action of the focusing muscle. The patient must be cautioned to use the eyes very little—perhaps a school boy or girl can throw aside the books for a week and get out into the open, where we come back to the conditions which we know are helpful to the eyes as well as to the general system. I think there has been too much of tendency to tide the patient over, and allow him to continue his vocation or his work under a strain. Perhaps he is forcing himself to get thru with an examination, or has some business affairs to attend to, that we are trying to tide him over. But if we want to prevent a permanent damage being done to the eye we will have to make him get away from his work for the time being, because that is the only way for the body to get enough resistance to help to overcome the condition permanently.

DR. W. L. BENEDICT, Rochester, Minn., It seems to me that we have three important points or conditions in visual fatigue: In the first place I would like to

have Dr. Jackson explain the difference between ocular fatigue and visual fatigue. I think that in giving psychology talks we find that the psychologists are very frequently using "fatigue," where the ophthalmologist will use "adaptation." The thing we usually speak of in fatigue, or tiring, means adaptation to them.

Now, in the practical application of fatigue we have the X-ray men, who are working in a dark room. Some of the men on my staff work with a light in the room and others in a dark room, and questions of individual adaptation are injected into this matter—the question of preference as to how much light they shall have.

The other point I would like to have the doctor explain is the advisability of putting on colored glasses; the glasses which are supposed to filter out some of the light.

DR. JACKSON. The term "visual" fatigue connected with vision, including the central apparatus concerned with vision, seemed better than "ocular" fatigue occurring in the eyeball. Fatigue attending use of the eyes seems more largely dependent on the state of other parts than it is upon the eyeball itself. The exception to that proposition is the retinal fatigue attending prolonged use of the eye for sharply contrasted objects like the print on a page. But other fatigue that is of practical importance probably arises in the coordination of the different actions required in vision. "Visual" applies to the whole visual act, "ocular" to what might occur in the eyeball.

Colored glasses have been used very extensively and very loosely, and with very hazy notions of what was to be accomplished with them. I believe that glasses that lessen the amount of light, filter out particular radiations, have their chief value as a supplement to adaptation. They can be used to do a part of the work of adaptation of the eye, when this would be excessive because of the particular conditions under which the eye is used. We use our eyes largely in indoor life and it is the indoor worker who needs colored glasses when out of doors. His eyes have become adapted to conditions of radiation different from those out of doors; and the glasses will help him to get over the gap between the two—to supplement the physiologic change. The whole subject of the use of glasses that act as ray filters, cutting out one set of rays or another, whether this depends on the color or some other characteristic of the glass, needs to be gone over with more consideration of color vision and the general subject of adaptation.

The tests that have been applied with reference to night flying seem to open up a very wide field, in which we can come to understand this process of adaptation much better than we have done. But I think that adaptation must be regarded as very closely allied to fatigue and recovery from fatigue. It is a specialized fatigue—a fatigue that serves a purpose. When we expose our eyes to bright light, if the eyes are adapted to bright light they serve us better. On the other hand, when we go into feeble light the rest, or dark adaptation, gives us an advantage.

AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS.

REPORT ON GRADUATE TEACHING OF OPHTHALMOLOGY IN AMERICA.

Starting with the proposition that the fundamental instruction of all members of the medical profession should be the same, it was long assumed that systematic teaching in special branches was unnecessary. The specialist, if he were to be tolerated at all, must develop by individual study and experience.

The opportunities offered by the older graduate schools of medicine were simply opportunities to see cases of the particular class in which the student was interested, to see how they were managed by those in charge of the work; and, incidentally, to have attention called to salient points in these particular cases, in a kind of limited clinical teaching.

Only within the last very few years has it come to be generally understood that this voluntary individual study; and clinical teaching with regard to the limited proportion of eye diseases that happened to present in the teaching service, furnished a defective preparation for special practice. But this has now been realized by many of those engaged in graduate teaching, and an active effort is being made to improve the methods of preparing for ophthalmic practice.

The methods of graduate teaching of ophthalmology are in a state of rapid transition. To emphasize what the change should be, and to chronicle what advances have already been made is the chief concern of this report. In this connection it must be kept in mind that marked superiority in plan of instruction, in one institution as compared with another, may represent the advances of only a few months; and the institution still considerably behind in its methods may quickly close the gap that now separates it from its more advanced competitors.

It must also be borne in mind that the need for good clinical teaching still exists and will continue to exist. The systematic teaching which those preparing for ophthalmic practice must have, will make clinical opportunities more valuable than they could ever be without it. To make

them of greatest value the contact of the graduate student with the case must be so close and so continued, and the supervision of the teacher so direct and minute, that only very small numbers of students can study a case together. Real clinical instruction to large classes is an impossibility.

The improvement of the quality of such instruction requires that all available opportunities for it be kept open and extended. The fewer the students that can be taught from a single case, the greater the number of cases that must be made available for teaching. Therefore the institution that offers only clinical instruction, altho it cannot furnish a complete properly rounded graduate course in ophthalmology, can furnish an essential part of such a course; and on that account should be sustained, encouraged and developed in every way possible.

With this clear understanding of the necessity for both classes of institutions, we believe that it will be helpful to those preparing for ophthalmic practice to divide, in a general way, institutions giving graduate instruction in ophthalmology into those that undertake to give a complete and systematic course, and those whose work is mostly or exclusively clinical.

Another fact regarding graduate courses in ophthalmology should be mentioned. In schools that are chiefly clinical, courses other than clinical have been announced. Thus a course on operations, or one on physiologic optics has been planned to be given when applied for by a sufficient minimum number of students; and lacking such a class, it would not be given. These courses were all voluntary. They were supposed to be available for those who wanted to take such extras. Those in fundamental branches were taken by a small proportion of the students, all of whom took the clinical work of the institution. The clinical work thus corresponded rather with the required curriculum of the undergraduate school, and these special courses to the electives.

This is still the status of the graduate teaching of ophthalmology in many of the

institutions of this country. What we have had has been clinical teaching of variable quality, supplemented by voluntary courses outside of clinical work. What is needed, and is now beginning to be supplied, is systematic teaching of fundamentals, followed and supplemented by clinical work; the whole course being bound together and made effective by testing its results by examinations covering the whole field of ophthalmology.

Our review of existing institutions for the graduate teaching of ophthalmology in the United States can now be made in a general way, by referring to each institution as following the old or the new plan. As this is the first review of the kind that has been made; and in view of the rapid transition that is going on in all these institutions, it is given without any attempt at exact statement of minute detail. Such a survey should be made again within a very few years; and correspondence between announced plan and actual offerings of instruction should then be closely traced.

BOSTON.

The Graduate Medical School of Harvard University has announced a rather elaborate grouping of elective courses of one month each, including all the fundamentals in ophthalmology. Some of these courses have been given during the last year, and some have not. The institution is clearly on the old style basis of opportunities for fragmentary, individual, elective study. For the month of May these courses are grouped and co-ordinated to the extent of offering daily a full day's work in ophthalmology.

The Massachusetts Charitable Eye and Ear Infirmary offers opportunities, including a wealth of clinical material handled by most intelligent and careful ophthalmologists. This constitutes a school of clinical instruction, for the few who serve as internes and assistants, equal to any accessible anywhere. But it gives no systematized course in fundamental branches, and exercises no care that the whole clinical field shall be covered in any unit of time. Boston University gives clinical courses in diseases of eye, with lecture courses in Refraction and clinical ophthalmology.

NEW YORK CITY.

In its Ophthalmic Service, the New York Eye and Ear Infirmary opens its great clinical field to graduate students thru separate courses on special subjects, as effective demand is created for each of these courses, by the coming together of a sufficient group of students. This is clearly the old plan of instruction.

The Manhattan Eye and Ear Hospital offers a nine months' course filling in the greater part of each day with eye, ear, nose and throat work. This is still largely clinical, altho provision is made for teaching of fundamentals. The latter needs to be systematized and extended, to bring the course fully up to the requirements of those preparing for modern ophthalmic practice.

The Herman Knapp Memorial Eye Hospital has until within a few months been upon the plan of clinical opportunities offered all the time, and special courses as applied for. It is now going on the new plan, a systematic course on ophthalmology given at definite times and in regular sequences thruout the year. These courses last 3 months and include an additional 3 months of clinical work. Each class is limited to five students.

The New York Post Graduate School and Hospital has had in operation for more than two years a three months' intensive course in ophthalmology; including real teaching in fundamental branches, with work in pathology under a full time teacher of that subject. This is carried on along with a full and comparatively well organized clinical course, and made to occupy the whole day, six days in the week. It is a course in which the student can do a great deal of hard work, and by it can gain a great deal in the time allotted. These courses are repeated in immediate succession throughout the year. The school is fairly well equipped, has a full and active corps of paid instructors, and is established on a basis that enables it to meet fairly well the modern requirements of graduate teaching in ophthalmology.

The building of the New York Poly-clinic has been used during and since the war as an United States Embarkation Hospital. Its out-patient department has

been continued with a limited service, but it offers little else for the student.

PHILADELPHIA.

The Wills Eye Hospital, established partly to give opportunities for members of the medical profession to become better acquainted with eye diseases, offers no systematic instruction. Its clinics are open freely to the physicians who choose to visit them; and offer, daily, an abundance of cases of all sorts. These are utilized by students of the attending surgeons who are connected with teaching institutions. But with abundant material for the study of pathologic anatomy and histology, the opportunities for the study of this branch, fundamental to ophthalmology, is entirely neglected by most of those who visit the clinics of this hospital.

The University of Pennsylvania now includes, as its graduate school in Medicine, the former Medico-Chirurgical College and the Philadelphia Polyclinic. In these institutions in the lecture rooms and laboratories in West Philadelphia, and in various hospitals, is given a ten months' course. The first eight months include laboratory and class room instruction and demonstrations, as well as clinical work.

This course is given by 18 professors of various branches; Ophthalmology 6, Neurology 3, Anatomy 2; and one each of Neurosurgery, Pathology and Bacteriology, Physiology, Surgery, Roentgenology, Medicine and Psychology; with 8 associate and assistant professors, 3 instructors and 3 assistants. The class is limited to 16 students. An average of about 6 hours formal instruction per day is provided, for five days in the week, with some laboratory work and clinics on Saturdays. Access is given to adequate medical libraries; and the student is required to make detailed reports of certain cases.

The basic schedule of study varies somewhat from month to month, including in the beginning the anatomy, physiology, refraction, case histories and records, medical ophthalmology, and ophthalmoscopy, especially of the normal fundus, with a few clinics. Later the clinical work increases, the classes being divided into sections and there are dem-

onstration courses on injuries, operations, etc. The last two months are purely clinical.

For the successful completion of the above course the passing of an examination after the end of the first eight months, the student is given a certificate; or a permit to enroll for the second year course. The second year course is devoted to certain advanced studies, practical work as a clinical assistant, and research work. It may lead to a degree of Master of Science in Ophthalmology, or Doctor of Science in Ophthalmology. The whole course is designed to fit men for the special practice or teaching of ophthalmology.

CHICAGO.

The transitional conditions that mark graduate teaching of ophthalmology throughout the United States are especially noticeable in Chicago, where the Chicago Post-graduate School, the Polyclinic, and the Eye, Ear, Nose and Throat College, are all still on the old familiar basis of clinical and fragmentary teaching. To the Illinois Eye and Ear Infirmary may be applied what has been said above about the Wills Eye Hospital of Philadelphia, except that the function of giving instruction to the profession is not so well recognized as essential, in the Chicago institution.

Recently there has been a movement to unite the above institutions by some agreement that would coordinate their activities, and might give opportunities for the economic use of the student's time, unsurpassed anywhere. But this movement has been delayed or suspended, at the instance of those who are planning departments of graduate teaching in connection with the Universities, the medical departments of which are looking forward to reorganization, and may in a few years offer large opportunities for graduate teaching.

ST. LOUIS.

In the Washington University a special course has been arranged to meet the needs of students from the Medical Department of the U. S. Navy. This has been given in conjunction with training in other branches. The work in Oph-

thalmology occupies 3 days a week for 13 weeks, a total of 255 hours. Of this time one hour has been given to the anatomy of the eye and orbit, one to history taking and literature, 2 to physiologic optics, and 10 to histology, pathology and bacteriology. The remainder of the time is devoted to methods of examination and diagnosis, and practical clinical work. This constitutes an eminently "practical" or clinical course, covering much the same ground as was occupied by the older clinical courses; but improved in that it has been made more definite and systematic.

SAN FRANCISCO.

The San Francisco Polyclinic is now connected with Leland Stanford, Jr., University. During the war its activities were partly in abeyance; but it is now becoming more active again, although practically along old lines. It has a small, fairly equipped eye department: that, with its university connection, should enable it to give a complete course in ophthalmology to a limited number of students. An increase in its corps of instructors will be necessary to enable it to utilize the whole of the student's time to good advantage. But it will be possible to establish here an institution for giving good ophthalmic training to small classes; that is much needed on the Pacific Coast.

NEW ORLEANS.

Something is being done to teach ophthalmology in New Orleans along the old lines of graduate teaching; and the training of clinic assistants offers what has heretofore been the best training obtainable in most American cities. But the Eye, Ear, Nose and Throat Hospital, the eye department of Tulane University, and of the Turo Infirmary are themselves in transitional conditions; and planning for the future rather than offering the greatest facilities of which they are capable at present.

OTHER CITIES.

In a number of other cities, as Baltimore, St. Louis, Cleveland, Cincinnati, etc., there are possibilities for graduate teaching of ophthalmology that could be

speedily and rather easily developed; but no movement to bring this about in the near future is apparent, and no general opportunities are now offered to those seeking ophthalmic training.

UNIVERSITY FELLOWSHIPS.

The school of serving as clinical assistant is open to a limited number in all ophthalmic clinics. But in three of our strong universities this has been developed to a more systematic and effective plan of training.

At the University of Michigan at Ann Arbor, a small number of students are taken on a "Fellowship" basis. They assist in the clinical work, in positions of successively increasing responsibility. They receive systematic instruction, and later have the educational advantage of instructing their successors. Thus in two or three years of full time continuous work an almost ideal training in ophthalmology may be obtained by the few who can avail themselves of such opportunities. Something of the same kind, although completely developed, is being done at the University of Iowa, in Iowa City. But the most complete working out of this plan of instruction is seen at the University of Minnesota, at Minneapolis and at the Mayo Foundation at Rochester, Minnesota.

At Minneapolis there are 5, and at Rochester 4, Fellowships in Ophthalmology and in Oto-Laryngology. During the first year the time of the student is devoted largely to the fundamentals. An average of 300 hours is given to special anatomy, histology and embryology; and 100 hours to physiology of special senses and physiologic optics. Special pathology 24 hours, is also given during the first year; and special courses of 4 to 12 weeks each cover the field of ophthalmology. On completion of the course on physiologic optics and the didactic course in refraction, the student spends an average of 6 hours a week, throughout his course, in the refraction clinic.

During the second and third years, the student devotes his time largely to clinical work and his thesis work, serving as a teaching assistant in the out-patient clinics, and as special interne in the hospital. The duration of the course is two

or three years leading to the Master's or Doctor's degree respectively.

The Fellowships, both at Rochester and the University carry a stipend of from \$600.00 to \$1,000.00 per year. The University is also preparing to establish a one year course to consist chiefly of advanced work in the fundamentals.

A SUMMER COURSE.

The University of Colorado offers a summer course designed to ground those who take it in the fundamentals of ophthalmology; and to prepare them to profit by the clinical opportunities afforded by graduate schools that do chiefly clinical teaching, or by service as assistant in an ophthalmic clinic or practice. This

course has heretofore covered 6 weeks, increased until now it occupies 12 weeks. The whole day is given to the study of ophthalmology. Students who have had the required preliminary training in mathematics and physics, and a year of internship in a general hospital, or its equivalent, may, after completing this course and passing the required examination, become candidates for the degree, Doctor of Ophthalmology. These are required to devote an additional year to the study of ophthalmology and to prepare and defend a thesis embodying original research. This year may be taken at the University of Colorado or elsewhere.

EDWARD JACKSON,
WALTER B. LANCASTER.

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JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

THE CLASSIFICATION OF CATARACTS.

Our knowledge of the pathology and etiology of senile cataract is so limited and incomplete, that it is no wonder our ideas are still unsettled on many points, and contradictory statements and terms are accepted and go unnoticed.

Altho Becker's researches more than 30 years ago had shown that the nucleus itself never, or at least very seldom, becomes cataractic, there is not in general a clear understanding about the respective roles played by the nucleus and the cortex, in the development and ultimate outcome of the opacity. Many a student, witnessing a cataract operation, considers the large yellowish translucent nucleus as the cataract itself; not realizing that the soft white lens matter coming out with, or after the nucleus, and scarcely noticeable for him, constitutes in reality the opacity of the lens.

The nucleus undergoes with advancing age a physiologic process of sclerosis beginning in the center, the fibers being compressed and flattened by the apposition of new fibers in the periphery.

These fibers can not be cast off as other epithelial structures placed on the surface of the body are; but remain in the center, and altho changing in color to a yellowish or brownish hue, do not lose transparency.

The process of degeneration which we call senile cataract, takes place only in the layers of cortex surrounding the nucleus; and in the beginning has two distinct clinical types; the opacity being formed either near the equator or directly forward or behind the nucleus in the area of the pupil. When the opacity begins in the equator it is called *cortical cataract*, and if initiated in the area of the pupil *nuclear cataract*.

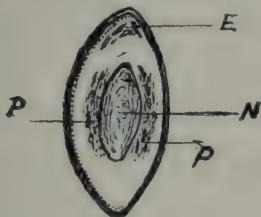
This classification, however, is radically wrong inasmuch as the nucleus itself not becoming opaque, there can not be a question of a nuclear cataract.

Furthermore, both types are really *cortical*, the only difference being in the starting point of the opacity. For that reason the term *cortical* ought to be dropped from our language, and the type of cataract beginning in the periphery—generally by opaque strokes or sectors—be called *equatorial cataract*.

The other form appearing in the center of the pupil as a light haze or cloudy white spots, and due to the opacity of the layers in front and especially behind the nucleus, ought to be called *paranuclear cataract*, that is, near the nucleus.

Other designations, for example, "perinuclear," will not be accurate, as the cloudiness does not surround, in the beginning, the nucleus; and, moreover, this term has been already applied to zonular cataract. The name supranuclear, proposed by Bach, is also inaccurate.

Some authors call "subcapsular" all types of cataracts which are not in the



Schematic drawing representing the two types of senile cataract. N nucleus. E equatorial cataract. P perinuclear cataract.

capsule itself, and in this sense subcapsular or cortical have the same meaning. Bach, however, has applied subcapsular to the equatorial form, only increasing thereby the existing confusion in terminology. We must then separate two clinical forms in senile cataract, the equatorial and the paranuclear, both being cortical, both being subcapsular, and both outside and around the nucleus.

Some authors have described lately as an independent entity a smoky cloudiness appearing in the center of the pupil and disappearing gradually in the periphery, which they call "senile nuclear," and in which the nucleus itself may have undergone a process of opacification, but there is not yet sufficient pathologic data to substantiate this claim.

M. URIBE TRONCOSO.

THE DIFFERENTIAL DIAGNOSIS OF CONJUNCTIVAL FOLLICULOSIS AND TRACHOMA.

The age-old controversy over the diagnosis of conjunctival folliculosis and trachoma is again revived in a fervent article by Jersey of Greenville, S. C. This

article was read before the Section on Preventive Medicine and Public Health, of the A. M. A., at New Orleans, April, 1920, (Journ. A. M. A., Oct. 23, 1920) and was apparently acrimoniously discussed by some of the brightest minds of the profession. This was evidently instigated by the differences in opinion, necessarily those of diagnosis and treatment of the medical officers of the United States Public Health Service, in South Carolina, who are alleged to have made in one community a diagnosis of sixty-six (66) cases of positive trachoma, out of approximately 1,000 school children examined, forty (40) of these same children having been seen by the author and, in his opinion, none of them had trachoma, but did have conjunctival folliculosis.

Some years ago there was a furor in New York, Philadelphia and other Eastern Cities, which broke into the public press—headlined in heavy type—over the alleged prevalence of trachoma in school children and hundreds upon hundreds of these were subjected to the expression and other operations, with resultant alleged cure in most of them, within a few days. Many children were excluded from school under this supplemental diagnosis.

It is to be admitted that trachoma is endemic in certain parts of America, but it also must be acknowledged that conjunctival folliculosis is worldwide and is to be found in practically all children, especially in those who have enlarged tonsils and adenoids, for it is practically the same as adenoids of the conjunctiva, simply a hypertrophy of the conjunctival follicles, which gradually diminishes as the child grows older and which, in but few cases, gives rise to any symptoms.

Most cities, localities and even separate states of America, except for imported cases, are relatively free from true trachoma. Trachoma, too, is not a disease of children. It is seldom seen under puberty, even in families in which the adults are afflicted. When acute, it is a highly contagious disease and almost always several members of a family suffer together.

Therefore, we look askance upon such diagnoses as were apparently made in the survey of the school of Newberry, S. C., of sixty-six (66) cases of positive trachoma distributed among fifty-five (55) different families. We, too, who do not see many cases of trachoma and do see many of follicular disease, look with suspicion upon the authenticity of the diagnostic, trachomatous furor of several years ago, in the Eastern states. We are incredulous about the cure of trachoma within a few days or weeks, by one expression operation;—for we know that trachoma is an intractable affection; that a combination of both operative and medicinal treatment is necessary for months before a case can be stated to be cured. We know, too, that all cases of trachoma, no matter how light and no matter how treated, are always followed by cicatrices in the lids and that follicular conjunctivitis never has these accompaniments. There are a few cases that may be classed as "borderline," but in these the finding of trachomatous masses, socalled bodies, should establish the diagnosis. Microscopic section of these is readily made and the diagnosis instituted.

It would be witless, indeed, to wade through the vast literature on the subject. The writer, himself, remembers his own researches published in the AMERICAN JOURNAL OF OPHTHALMOLOGY, December, 1890, in which the jumble of ideas was sifted and, to his mind, a sharp differentiation then made between the true disease trachoma and the symptom folliculosis, which yet holds good, and this has been gone over and over again by others.

Had this dispute arisen over the diagnostic differences between vernal conjunctivitis and trachoma, perhaps it would be more readily understood; but even here the story is plain to the expert.

Far be it from us to detract from the very excellent results obtained in Kentucky and other places, by the examiners, lecturers and operators of the United States Public Health Service, especially those designated as trachoma experts. (Journ. A. M. A., Oct. 23, 1920.)

However, where such a difference of opinion has arisen, as is evident in

the Southern states, it would be well for the authorities to have, for instance, examiners officially recognized by the Section on Ophthalmology of the American Medical Association, in order that certain localities be not stigmatized as the sites of malignant and dangerous forms of trachoma, and that our school children with folliculosis be not excluded from the public schools and subjected to operative treatment which, even in folliculosis, will certainly leave scarred lids and a certain amount of disability. Certainly no folliculosis cases, even of the follicular type of trachoma, should be subjected to operation before lighter measures are used, under influence of which the larger number will speedily lose their objective symptoms and the subjective, if any, be remedied.

H. V. W.

THE INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

The committee in charge of the organization of this gathering met in Kansas City, in connection with the meeting of the American Academy of Ophthalmology and Oto-Laryngology, October 15. With the adoption of the report made from it to the Academy, all of the national organizations of ophthalmologists have given their approval to its work; and the profession of America is squarely behind the enterprise. This means America in the broad sense, for both Canada and Spanish America have been represented upon the committee from the first.

The date has been set for opening the Congress in Washington on Tuesday, April 18, 1922. Authority has been given to shift this date slightly in case better provision can be made for the Congress by so doing, or it will better fit in with the national gatherings of the American Medical Association and the Triennial Congress of Physicians and Surgeons to be held in the spring of that year. But careful inquiry seems to show that the largest proportion of our visitors from Europe can come most conveniently during the Easter vacation and that year Easter Sunday falls on April 16.

The invitations to join and attend the Congress are now being sent out. They are addressed to National organizations of Ophthalmologists, and the Governments of Countries with which the United States has diplomatic relations. They will also be sent to individuals. The intention of the committee is to make the membership widely inclusive of members of the medical profession especially interested in ophthalmology; and some others working in optics and related branches of science. Those camp followers of medicine who seek connection with such an organization for advertising purposes will be excluded, so far as their character and purpose can be discovered.

It is likely that some who would be welcome to membership will not receive personal invitation to join. These should take the initiative, send in applications or get in correspondence with the Chairman of the committee on membership, Dr. Walter R. Parker of Detroit.

E. J.

WHICH LANDOLT?

The name of Landolt has been made most widely known among ophthalmologists by Edmund Landolt, who has worked in ophthalmology as practitioner, teacher and writer for many years in Paris. This is the Landolt of the Treatise on Refraction and Accommodation of the Eye, the broken ring test of vision, etc., etc. Of recent years, the younger member of the family, Marc Landolt, our collaborator in this JOURNAL, has worthily sustained the scientific position of the name.

Before the American troops went thru the Argonne region, there was in Strassburg a "Professor Doctor Landolt," who might have designated himself by the letter H., who wrote on the light sense in myopia, and the correction

of exophoria by wearing concave lenses (not needed for myopia).

For some years Dr. Edmund Landolt has urged in French, English and Spanish the improvement and accurate proportioning of surgical instruments. His annoyance is therefore excusable when a firm making surgical instruments in Freiburg, Germany, sends out in the lately "enemy countries" advertising matter stating that their instruments have the approval of "Professor Doctor Landolt." The original maker of the ophthalmologic reputation of the name naturally protests.

"No abbreviations," he desires. We confess to having offended in this. It has not always been easy in the past, sometimes not possible, thru the literature that came to us for review, to identify the Landolt to whom it should be credited. But we will try to do it henceforth. We have been able to discriminate between Priestley Smith, and Major Henry Smith and Homer Smith, and will try, with the help of editors of other journals, to do so among the Landolts. There have always been protests against confusion of authorship; and we have yet to hear of an author who liked it. That is the reason for attaching one's full name to a paper, and seeing (so far as that is humanly possible) that it is printed right.

E. J.

A CORRECTION.

On page 11 of our January issue the pictures for Fig. 9 and Fig. 10 are transposed, giving an impression the opposite of the truth regarding Case V of those reported by Dr. Sanford Withers. Eternal vigilance is a part of the price of a good journal. It is extremely easy for such an exchange of electrotypes to be overlooked by the printer until the page has been printed.

BOOK NOTICES.

History and Bibliography of Anatomic Illustration, by Ludwig Chouulant. Translated and Edited by Mortimer Frank, B.S., M.D., Chicago. 463 pages and many illustrations. University of Chicago Press, Chicago.

In addition to a translator's preface and some interesting footnotes by Dr. Frank there is included an admirable memorial notice of him by Dr. Fielding H. Garrison.

Way back in 1852 there was published, at Leipzig, a monumental essay on Anatomic Illustration, by Chouulant, who was Professor of Medicine in the University. The book has been out of print for many years; and we now owe to our former confrère, Dr. Mortimer Frank, of Chicago, a translation and reprint with the addition of more interesting material referring to the subject.

Chouulant was a pedagogue of pedagogues. Reading the history of his life, shows that he was certainly one of the original conservatives and, tho he had a high position in the University, was rather an unpleasant personage. He was a lavish writer and apparently in all his writings, as well as in this book, he was great on German "gründlichkeit."

This work shows abstruse learning and an immense amount of investigation, dealing as it does, not only with purely medical illustration, but also with anatomic illustration having to do with art studies. Of these, of particular interest, are the sketches of Leonardo da Vinci, 1510 A. D., and Michelangelo, 1474-1564 A. D., whose drawings show result of actual dissection and are very complete. Of purely medical authors of the old days, the illustrations of Vesalius, 1543 A. D., are noteworthy for their accurate and clear drawing.

The grotesque character of earlier paintings and drawings of the anatomy of the human frame, is evident from the reproductions shown. Anatomic illustration has been considered from two viewpoints. 1. The aid rendered to anatomic science by the

graphic arts. 2. The aid rendered to the graphic arts by anatomic science. Pure anatomic drawing presents little of artistic anatomy, whereas artistic drawing is practically the idealized depiction of anatomic structures.

In the old days there were no means of reproduction and even when engraving on stone, wood and metals came into existence, the output of anatomic illustration was very little in comparison with what it is now, as photographic reproduction has largely and almost entirely taken the place of hand drawing. Even yet, however, the necessity for diagrammatic illustration exists and so for depiction of structures and organs that cannot be satisfactorily photographed; as yet obtains with illustrations relating to the fundus of the eye.

The work is freely and beautifully illustrated and printed. Our confrère, the translator, recently died and this work has been issued as a monument to his memory. The brief memorial notice of Dr. Frank which it contains is from the pen of Dr. Fielding H. Garrison of Washington, D. C.

H. V. W.

Aviation Medicine in the A. E. F., February, 1920. Prepared in the Office of the Director of Air Service. Document 1004; 322 pages, tables, charts and illustrations. Washington, Government Printing Office.

This is a Government publication of intense interest at this time, giving as it does the results achieved by the Medical Profession in the development and care of the military aviator; and is an exposition of the end results of the many thousands of examinations made by the special boards who examined candidates for aviation during the great war.

The work itself comes under three personal heads: 1. The selection of the flier. 2. The care of the flier. 3. Investigations relating to the flier. All of which are exhaustively entered into.

We, as ophthalmologists, are specially interested in the eyesight of the flier. Not only the medical men, but the fliers themselves, realize that of all

the physical attributes; vision is most important; and the eyes should be absolutely perfect in every particular to successfully do the work and withstand the strain to which they are subjected.

There is a difference between good eyesight and being able to see well. Every pilot must learn to see in the air, and his ability for "air sight" improves with practice.

Absolutely normal hearing is not essential to the flier, but it is better to be normal in order to hear the engine and the hum of the wires; and the first intelligence of the approaching enemy has often been thru the hearing of the machine gun fire, especially if the pilot's observation has been at fault.

The altitude to be achieved by each flier, his "ceiling," should be estimated in each case, for the thin air, cold and wind, and his reactions in certain cases obtund the sensibility, the eyesight, the hearing and mentality, so that otherwise good fliers should not, as a rule, go above the altitude in which they can keep on the qui vive.

In order to determine this, Major Schneider has exhaustively worked out the efficiency of men at various altitudes. Lt. Col. Henry Horn takes up the role of the labyrinth in flying efficiency, determining that a functioning labyrinth should be required of a pilot. But, as regards the tests, no set limits should be made on the symptom of nystagmus, as both the period of nystagmus and the past pointing, as well as the vertigo and the falling signs, derived during these tests, are diminished by practice in the air.

The Eye in Aviation is taken up by Col. Wilmer and Major Berens, not only from the medical aspect, but from the personal side of the aviator. It is necessary for the "Eye of the Army" to have good eyes himself, particularly sharpness of vision, good muscle balance and good color vision, not only in order to see the enemy, but to avoid the accidents of getting off and landing. In fact, of the fatalities in war, nine aviators were killed by accident to one by combat; and of these cases, it has been shown that a large portion

of the accidents were due to physical defects of the aviator, which might have been eliminated and were in a large measure in the last days of the war, by careful medical examination, supervision and instruction.

One of the particular present necessities, is the question of goggles for aviators, which may apply to many other vocations as well. For the flying man the goggles of the future should not limit the monocular and binocular visual fields. Where a tint is required, it should allow the maximum vision, be restful to the eye and not alter color tones seriously. Lenses of a yellow green tint are valuable.

Much is gone into as regards the causes of accidents and their prevention. It would seem that of all the allied fliers, the Americans were possibly the best taken care of. The English and French were forced to use men whose physical qualifications were not up to those of Americans. Yet many of them, owing to their opportunities, did more wonderful work than any of ours. The Italians, particularly, made good fliers, and were rigidly examined and properly taken care of.

The work was prepared under the direction of the Chief Surgeon, A. E. F., by Lt. Col. Wilmer, and is published from the Office of the Director of Air Service, for the information of all concerned.

H. V. W.

Festschrift Hermann Kuhnt zum 70 Geburtstag. Contributed by former students and friends. 708 pages, illustrated with 13 plates, and figures in the text. Berlin; S. Karger, 1920.

This tribute to Professor Kuhnt is all the more fitting in that it takes the form of volume 43 of the "Zeitschrift für Augenheilkunde" founded by Kuhnt and Michel 23 years ago, and ever since conducted by the man whose seventieth birthday it commemorates. It contains as a frontispiece a photographic portrait of Kuhnt; but beyond this and its title, no personal matter.

There are fifty-one scientific contributions from authors living in Germany and its recent allies, and a few

adjoining neutral countries. The first, by the veteran, Hirschberg, whose seventieth birthday was celebrated seven years ago, deals with the visual theories of the Greek philosophers and their relation to ophthalmology. The subjects of all these essays are given under the appropriate divisions of current literature; and later they will be noticed in the digest of the literature therein. The plates are chiefly photographic reproductions in black and white, with one in colors illustrating the subject of serous iritis and its relation to cyclitis and glaucoma. The paper and printing of this volume are well up to the standard of the *Zeitschrift* in former years.

The work of Kuhnt, aside from his establishing and editing of one of the most important German ophthalmic journals, has had a notable influence in various branches of ophthalmic surgery; as in the use of conjunctival flaps for wounds, the application of excision of the tarsus for trachoma, and the entrance of the needle for discussion thru vascular tissue. He is worthy of this mark of respect on the part of his colleagues.

E. J.

**Practical Medicine Series, Volume III,
The Eye, Ear, Nose and Throat.**
Edited by Casey A. Wood, C.M.,
M.D., D.C.L.; Albert H. Andrews,
M.D.; George E. Shambaugh, M.D.
(See also p. 58.)

We welcome annually the arrival of this little volume, the epitome of the year's advances in the specialties of medicine relating to the head. Never does the book take in all the articles published, but selects a few of the most important; the abstracts being fairly extensive and thus more illuminating than those found under the same headings in the journals.

The book has a frontispiece in colors, a reproduction from our *JOURNAL* of some of the reviewer's painting of the fundus, on Neuroretinitis Syphilitica. This being reproduced by the 3-color process has thus lost much of the effect of the original drawings and is

nowhere near as good as the 4-color plates used in our *JOURNAL*.

The article itself is quoted in extenso, as are several others; notably those by Paterson and Fraser, on Intranasal Dacryocystostomy, where this operation is most highly commended. And yet others, as A. K. Wilson and W. C. Posey, frankly prefer excision of the sac for chronic dacryocystitis, as does the reviewer.

The abstract of T. Harrison Butler's article on Experiences and Statistics of the Cataract Operation, is a clear exposition showing 93.5 per cent of immediate successes, with failure in 6.5 per cent; 5.5 per cent of vitreous loss in English cases, 17 per cent in Palestine cases; 10 per cent of iridocyclitis in England, with absolutely none in Palestine; 10 diabetic cases, of which 4 were lost. In England, iridocyclitis was responsible for all the failures.

A. B. Middleton has found 28 cases of congenital condition of the fundus or bulb causing reduction of vision, in soldiers referred out of 200,000 troops. Weeks prefers the Lagrange operation in glaucoma. The editor of the work, Casey A. Wood, pithily remarks that every case of glaucoma is not best and most certainly relieved or cured by one particular method.

Military ophthalmology is extensively treated by Sleight and Haughey, after the methods of Lagrange. Some new drugs, as hypophysin and flavine, are described. Casey A. Wood has an abstract of his article on the Eye of the Burrowing Owl. More than usual space is given to refraction and the ocular muscles.

The Ear Department shows nothing particularly momentous, except the appeal of the ear surgeons (L. A. Dean) for better preparation of those going into the specialty. Page after page is given over to tonsils and adenoids, and "new" instruments have again been invented and described for this common and ordinary affection and operations therefor. The study of the book is well worth while.

H. V. W.

TWO GERMAN TEXT-BOOKS.

Lehrbuch und Atlas der Augenheilkunde. Dr. Theodor Axenfeld, Prof. in Freiburg. Sixth edition, 856 pages, 12 colored plates, 2 color prints and 636 figures in the text, many in colors. Jena, Gustav Fischer, 1920.

This book was written by Axenfeld and eleven of his colleagues; and must be regarded as the leading German treatise on ophthalmology. The introduction to Ocular Pathology and Therapeutics and the Examination of the Eyes are written by Axenfeld; so is the one on Diseases of the Conjunctiva. Ophthalmoscopic Differential Diagnosis is by Elschnig; and Function Testing by Heine. Bielschowsky treats of Disturbances of Motility and Anomalies of Position; and von Hippel of the Embryology and Congenital Anomalies, and Diseases of the Lids.

Stock wrote on the Lacrimal Apparatus; Elschnig on Diseases of the Cornea; Krückmann on the Uveal Tract, Vitreous and Sclera. The Diseases of the Lens are discussed by Bach; and those of the Retina, Optic Nerve and Visual Tracts by Greeff. Peters wrote on Intraocular Fluids and Glaucoma, and also on Diseases of the Orbit. War Wounds, Sympathetic Ophthalmia and Accidental Injuries are considered by Hertel; and Heine writes of General Diseases and their Eye Symptoms. The Ophthalmoscopic Plates come from the Atlas of Oeller.

The sixth edition contains somewhat more material than its predecessors. The additions are especially noticeable in the section on war wounds (15 pages), illustrated by cases drawn from the recent war. But the effects of irritating gases, as developed in that conflict, seem rather inadequately noticed, in the less than two pages given to them. Anomalies of refraction are not ignored in this treatise, but are considered with physiologic optics, visual acuity, perimetry, color and light sense, etc., in the eighty-five pages of the section headed Function Testing. Likewise, toxic amblyopias come in with the ocular symptoms of general dis-

eases. But in this last chapter some of the more recent additions to our knowledge of the subject are quite unnoticed.

The illustrations include diagrams, charts of visual fields, instruments and how to use them, photographs of patients, and microphotographs of normal and pathologic histology. Both external diseases of the eye and representations of the eye ground as well as bacteria of ophthalmic interest are shown in the color illustrations scattered thru the text. Of course, among such an extremely large number there are illustrations of widely varying excellence and value.

The Axenfeld book has the completeness which lavish illustration can give. It is well arranged and its subject matter well classified, and it has a good index. The irregular performance of multiple authorship is here reduced to a minimum.

Lehrbuch der Augenheilkunde. Dr. Paul Roemer, Prof. zu Greifswald. Third revised edition. 508 pages, 297 illustrations and 32 colored plates. Berlin and Vienna, Urban and Schwarzenberg, 1919.

Roemer originally dedicated his book to Paul Ehrlich; this edition is inscribed to his own students who fell in the war. It was first published to afford his students, in permanent form, his clinical lectures, which they might have as a personal souvenir. Its original form has been preserved, and in recognition of postwar conditions the work is restricted in size. Both in its excellences and its defects, it is marked by the characteristics of the clinical lecture, reproduced in book form.

The clinic case, the class room diagram, and the microscopic slide are replaced by illustrations. The appropriateness of these, their restriction to the teaching purpose and the excellence of their reproduction, constitute the most strikingly valuable feature of the work. Every picture introduced has a point to it, which is excellently brought out; and no more space is taken up with it than is necessary for this purpose. This commendation ap-

plies preeminently to the edition before us; and only partly to the English translation of the first edition, which had only two-thirds as many text illustrations and two-fifths as many colored plates.

The arrangement and proportioning of the matter is inferior to that of the Axenfeld book, altho in some points the arrangement is similar. Diseases of the conjunctiva and cornea are treated together, and the latter rather inadequately presented. Diseases of the iris (only the most important forms of iritis) have a separate section; and the lens, vitreous, optic nerve and retina are all considered, before we have the section referring to diseases of the choroid, eleven pages, of which half is devoted to sarcoma and three lines to tuberculosis. The ciliary body finds no place in the table of contents.

In this work also anomalies of refraction and accommodation are considered under "Function Testing;" in a section of fifty-six pages which also treats of focal illumination, diaphanosc-

copy, ophthalmoscopy, perimetry, testing of light and color sense, and detection of simulation. On the other hand "Muscular Squint" has one section of twenty-six pages; and paralyses of the ocular muscles another section of thirty-three pages.

A feature that strikes one on looking into this book is the use of marginal headings. These are quite exceptional in medical books, and constitute a new departure of real value; utilizing the blank space which brings a disagreeable sense of waste to one who knows the present high cost of paper, and the difficulty of finding room for printed pages on his library shelves. On the margin of one page we have the guidance of: Keratitis Disciformis, Bandlike or Girdle Corneal Clouding, Drüsen Formation of Bowman's Membrane, and Calcification of Bowman's Membrane. We wonder when the agreements of printing houses and printers' unions in America will permit such marginal headings as a measure of efficiency and economy. E. J.

ABSTRACTS

Hartridge, H. The Inversion of the Retinal Image. The Journal of Physiology, Aug. 19, 1920, Proc. Physiol. Soc., May 15, 1920, p. 6-8.

In a recent paper Senet states that the retinal image is not inverted. The evidence on which the inversion of that image is based is absolutely reliable and may be briefly summarized as follows:

(1) If the eyeball of an albino animal be removed intact, and be mounted in a tube, so that while the rays from external objects enter the pupil, the posterior surface of the eyeball can be examined by an observer, then owing to the absence of pigment in the choroid the image formed on the retina is clearly visible. This image is seen to be inverted, top being at bottom and right being at left.

(2) In the case of an ordinary animal the choroid and sclera can with care be removed from the eyeball, leav-

ing the retina *in situ*, observation of the retinal image shows that it is inverted and transposed.

(3) Histologic examination shows that the exit of the optic nerve lies to the nasal side of the fovea. The blind spot thus produced is found by experiment to lie to the temporal side of the point of fixation. It can be proved that the blind spot does correspond to the papilla of the nerve, by an independent observer B directing a beam of light with an ophthalmoscope into the eye of an observer A. It is found that if B directs the beam onto the blind spot A only sees a faint diffuse glow, whereas if B directs the beam anywhere else A at once clearly sees it.

Further, if the angle subtended at the eye by the blind spot and the point of fixation be measured it is found to be equal to that of the fovea and the centre of the papilla of the optic nerve as measured from the posterior nodal

point. This would seem to give conclusive evidence that the retinal image is transposed in men, and therefore since the optical system of the eye is a symmetric one an inverted image also.

(4) Under certain pathologic conditions opacities formed in the eye media cast shadows on the retina. These are seen projected onto external objects and may be located by the perimeter or Bjerrum's curtain. It is thus found that opacities in one segment of the eyeball cause areas of blindness which occupy the opposite segment of the visual field.

(5) By applying a powerful light or sharply localized pressure to the exterior of the eyeball, as far from the summit of the cornea as possible, a glow is seen projected onto the images of external objects. This is found to occupy the opposite segment of the visual field to that in which the stimulus has been applied.

The above summarizes the evidence for the inversion of the retinal image and seems to me to be conclusive.

HENRY SEWALL.

Lafon, Ch. Nystagmus. Ann. d'Ocul. 1920, v. 157, p. 209.

The author discusses the question of nystagmus in a long article, with numerous case reports. Nystagmus is acquired or congenital. The former is accepted by all, but the latter is the object of discussion. It may be due to defect in vision, or to congenital lesions of various kinds. However, there are certainly cases where there is neither error of refraction nor congenital lesion, the loss of vision being due to the oscillations of the eye. Furthermore, similar congenital lesions are frequently not accompanied by nystagmus. These lesions and errors of refraction are predisposing rather than determining causes.

There are three forms: (1) permanent and regular, (2) irregular, (3) labyrinthine or cerebral. In (1) the oscillations are equal in the primary position and when looking up or down, but in the lateral position appear to have a slow and a quick phase. In (2)

the amplitude and the rhythm are unequal, at times modified by extensive, involuntary, more or less incoordinated movements. But there is no fundamental difference between (1) and (2). In (3) the movements are produced usually only in the lateral position of the eye, altho as in multiple sclerosis, a nystagmus may develop into a permanent one, resembling type (1).

Nystagmus is a static trouble of the eye. In looking to one side, for example, the appropriate contraction and relaxation of the muscles is performed correctly, but the static equilibrium cannot maintain the eyes in the new position. That is, there is a difference in the tone of the opposing muscles, which cause the oscillating movements. In permanent nystagmus, this is true also when the eyes are in the primary position.

Both movements are involuntary. It is not true that one is a voluntary one, attempting to correct the other.

Voluntary displacement of the eyes is governed by two functions, (1) direction and (2) convergence.

(1) Direction is subdivided into three functions: (a) laterality, (b) verticality, and (c) rotation, each being in relation with the corresponding semicircular canal and acting thru two pairs of antagonistic muscles. Nystagmus is a disturbance of one of these fundamental functions.

Convergence is always active, whatever the distance or position of the object observed may be, but its action is less in proportion to the distance of the object and the excentricity of its position. When the displacement of the eye is about 45 degrees, there is normally a slight, homonymous diplopia, which can be elicited only in the dark room. In nystagmus, convergence is not affected. In fact, it even exerts an inhibitory action on the movements. It is observed, however, in patients who do not possess binocular vision.

It is wrong to identify the ocular motor functions with the conjugate movement dependent on them, for each of the former is composed of two fac-

tors; (a) a dynamic which directs the eyes toward the object, and (b) a static, which maintains them in the position of fixation. Nystagmus is a trouble of the static factor of one of the elementary functions of direction.

LATENT NYSTAGMUS. The author discusses the theories of various authors and describes a couple of his own cases. He considers this condition to be a congenital nystagmus, which is evoked by interference with convergence.

A continuous sequence of forms connects latent with permanent nystagmus. This is shown by several case reports, arriving at the form where covering of one eye causes increase in the movements. When the vision of the eyes is about equal, the increase is the same no matter which eye is closed. But the covering of an amblyopic eye causes an increase which is distinctly less marked than when the other is covered. The same accentuation of movements can be caused by the use of a strong convex lens, or of a prism, base horizontal. It is possible, also, by covering one eye, to convert certain forms of rotary nystagmus into the horizontal variety.

PERMANENT CONGENITAL NYSTAGMUS AND CONVERGENCE. In most cases, the oscillations increase, or even first appear, in forced lateral positions of the eyes. This is due to interference with convergence, as proven by the following reasons: (1) In most cases, where the vision of the eyes is unequal, the movements are greater and more irregular when the eyes are turned towards the side of the amblyopic eye. (2) The nystagmic movement caused by covering of one eye is less marked and sometimes fails to appear in the extreme lateral positions. (3) If the nose is prolonged by a screen placed in the sagittal plane, the nystagmus of the primary position is not modified but it is increased in the lateral position as soon as one of the optic axes is intersected.

Convergence almost always diminishes nystagmus, sometimes abolishing it when the object is very close. The following facts are also to be noted:

(1) If a prism of 8 to 10 degrees base out is placed in front of each eye and the patient looks at a far object, the movements diminish or even cease, owing to contraction of the internal recti, as tho the object were very close.

(2) Often the decrease in movements is less or even nothing, if convergence is caused after an eye has been covered.

(3) After convergence has caused a decrease or disappearance of the nystagmus, if the object is brought closer, one of the eyes frequently makes a sudden movement of abduction, while the oscillations increase, altho the other eye continues to fix.

Decrease in nystagmus is most marked when the eyes are in the position of reading, due to the inhibitory action of convergence. This latter explains certain phenomena: (1) Many patients have vision of 1/5 to 1/10 for distance, altho they can read the finest type at 15 to 20 cm., errors of refraction having been corrected. (2) The necessity for having the object very close in order to secure good vision explains the early ocular fatigue of which the patients often complain. (3) Myopia is frequently present in nystagmus. It is not a cause, but an effect, due to the necessity of looking at an object close to the eye.

In rotary nystagmus, convergence may decrease the amplitude of the movements, but this is very rare. Fixation of an object, sometimes, not always, increases the movements. Some patients have immobile eyes when fixing, especially if the object is close.

From the above it is seen that convergence possesses an inhibitory action on congenital nystagmus. The greater the effort, the less the nystagmus, and conversely, anything weakening the convergence increases the nystagmus. The tendency towards convergence causes often a mild homonymous diplopia, which may even develop into strabismus.

Certain patients with nystagmus in the primary position can make it less pronounced by holding their eyes in a secondary position, e. g., turning the

eyes towards the right and the head towards the left. C. L.

Tresling, J. H. Retinal Angiomatosis.
Klin. M. f. Augenh., v. 64, 1920,
p. 306.

Tresling describes a family occurrence of retinal angiomatosis in two brothers, aged 29 and 25. The first patient stated that in 1916, he had V. = 6/6 in both eyes, but that the sight of his left eye failed a week ago. V. R. = 6/6, V. L. = 2/60. At the disc and the macular region small white foci, which within a month formed a large stellar figure, and recent hemorrhages. Upwards and downwards an artery with the accompanying vein grew large, became tortuous towards the periphery and merged into a red nodule. The lower nodule had twice the size of the disc, and the vessels showed distinctly thru, artery and vein connected by small vessels. With nodules projected from 8 to 9 D. showed no pulsation upon pressure, like the vessels. At the distal end small vessels emerged. Later on, a small artery

expanded and showed several nodular swellings.

The second patient also complained of impairment of sight of his former good left eye for a week. V. = 1/60. Slight opacity of the vitreous. The lower border of optic disc was indistinct and surrounded by a large white focus spreading into the nasal half of the retina. At the macula also white foci and above it a large greyish white area. Here an artery and vein with their branches were very tortuous, widened, and entered beyond the white area into a red well defined nodule, in which the vessels could be discerned.

While at the beginning the very marked changes of the retina suggested retinitis exudativa, the interior enlargement and tortuosity of the vessels decided the diagnosis of angioma-tosis retinae.

Wassermann reaction and general examination of both patients, who stayed at the clinic for four weeks, were negative. On account of the family occurrence the affection may be congenital, as was surmised by others.

C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS

Dr. Fontain Bruce Moore, Memphis, Tennessee, aged thirty-five, died at his home recently from pneumonia.

PERSONALS

Dr. Howard F. Hansell, of Philadelphia, spent the Thanksgiving holiday period at Detroit, Michigan.

Dr. Henry R. Lesser, of New York City, announces his removal from 35 West 114th street to 294 Central Park West.

Dr. L. Webster Fox, of Philadelphia, will spend his Christmas holiday vacation in a trip to Porto Rico.

Dr. Eugene M. Blake, of New Haven, has been appointed Assistant Clinical Professor

of Ophthalmology at the School of Medicine, Yale University.

Dr. William Hislop Manson has been appointed to the chair of Ophthalmic Medicine and Surgery in Anderson College.

Drs. T. C. Lyster, E. R. Lewis and I. H. Jones announce offices at 1920 Orange street, near Westlake, Los Angeles.

Dr. Blanche Norton has been awarded the Cross of King George I, in recognition of her work among trachoma victims in Greece.

Dr. George E. de Schweinitz and Dr. Thomas B. Holloway spent a brief holiday at Virginia Hot Springs over the Thanksgiving vacation period.

Dr. P. B. Wing, formerly of Tacoma, Washington, announces that he has opened an office in the Watts Bldg., San Diego, California.

SOCIETIES

The Chicago Ophthalmological Society held a joint meeting with the Chicago Neurological Society, on December 16th, which brought out interesting papers and discussions on the action of the pupil in various diseased conditions of the nervous system.

Doctor H. F. Hansell, of Philadelphia, read a paper before the Ophthalmic Section of the College of Physicians at its December meeting upon "The Ophthalmic Symptoms in a Case of Obscure Brain Disease," which was prepared for the last meeting of the American Ophthalmological Society, but which his trip to Europe prevented him from presenting.

Dr. George E. de Schweinitz, of Philadelphia, read a paper before the Section of Ophthalmology of New York Academy of Medicine on Monday evening, December 20th, concerning "Ocular Conditions in Pituitary Body Disease in Syphilitic Subjects with Illustrative Cases." The discussion was opened by Dr. Frazier of Philadelphia—Surgeon; Dr. Weeks—Ophthalmology; Dr. Dana—Neurology.

The Ophthalmic Section of the College of Physicians of Philadelphia held a joint session with the Sections of Rhinology and Laryngology on Thursday evening, November 18th. Dr. J. Parsons Schaeffer, Professor of Anatomy at Jefferson College, gave a lantern demonstration accompanied by an exhibition of a series of superb specimens illustrating the association of the "Optic Nerve and the Optic Commissure to the Paranasal Sinuses." The discussion was opened by Dr. James Bordley, Jr., of Baltimore and Dr. William Campbell Posey of Philadelphia, from the viewpoint of Ophthalmology, and by Dr. Charles P. Grayson and Dr. George Fetterolf of the University of Pennsylvania, from that of Rhinology. The chairman of the section, Dr. G. Oram Ring, gave a dinner to Dr. Schaeffer and the participants in the discussion at the Union League preceding the Section meeting.

At the recent meeting of the Medical Society of Virginia, a number of eye, ear, and throat specialists, realizing the need of an active organization in the state for the scientific study of the problems of ophthal-

mology and oto-laryngology, formally organized the Virginia Society of Oto-Laryngology and Ophthalmology. The following officers were elected for the first year: Dr. Hunter H. McGuire, Winchester, president; Dr. W. F. Mercer, Richmond, vice-president, and Dr. C. S. Dodd, Petersburg, secretary-treasurer. The first meeting of the Society will be held at The Jefferson Hotel, Richmond, Va., on February 3, 1921. In addition to a number of papers which will be presented by members of the Society throughout the state, there will be a symposium on Simple Glaucoma. Several invited guests of national reputation have been asked to deliver addresses on the various phases of ophthalmology and oto-laryngology. The new Society will, probably, meet semi-annually.

MISCELLANEOUS

A government bill in England, which went into effect in September, provides that every blind person who has attained the age of fifty shall be entitled to such pension as, under the Old Age Pensions Act, 1908 to 1919, he would be entitled to if he had reached the age of seventy.

Patrick H. Vaughn of Harrisburg, Pennsylvania, was known as the "model landlord." He refused to raise rents of his numerous properties during the war. In his will, probated in November, ten of his houses are set aside, in which the families of worthy blind are to be permitted to live rent free.

The President of the Moorfields Eye Hospital of London has issued an appeal for a fund of 100,000 pounds: (1) To pay off a heavy debt. (2) To enable it to extend its laboratory accommodations for purposes of clinical and pathologic research. (3) To supply adequately paid assistants to the Honorary Medical Staff, which will liberate them from much routine work which they now have to perform. (4) To supply adequate accommodation for the nursing staff.

The Chicago Lighthouse is an Industrial Training School for the Sightless, which is conducted by the Improvement Association for the Blind. It is not conducted for profit, but is a great humanitarian undertaking dependent upon the public for its support. At a recent meeting of the Board of Managers, it was voted to have a series of card parties for the benefit of the blind of the Lighthouse. One of this series was given on December 16. The prizes were all donated by prominent local shop owners, and about \$250.00 was realized.



PROLIFERATING CHORIORETINITIS.
RIGHT EYE, SEEN IN THE ERECT IMAGE.
(DANIS' CASE.)

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PROLIFERATING CHORIORETINITIS.

MARCEL DANIS, M.D.

BRUSSELS, BELGIUM.

This is the report of a case of a form of lesion described by Lagrange as frequently following war injuries. Read before the Belgian Ophthalmological Society, November 20, 1920.

OBSERVATION. Van E., Ch., aged 25 years, when 7 years old was injured by a stone, which expended its force on the right eye. The upper lid was divided, and vision was lost immediately and completely. The left eye presents a hyperopia of 5 D. without any other abnormality. In the right eye the hyperopia is 8 D., and the media are transparent.

On ophthalmoscopic examination there is seen in front of the optic papilla a gray white mass, opaque, mammilated and cloudy, somewhat club-shaped, its rounded extremity extended up and outward. With the binocular ophthalmoscope of Gullstrand it is seen to protrude decidedly forward. It completely covers the optic disc, and sends two thread-like prolongations along the nasal inferior vein and artery. (See plate III.)

Behind the above mass the posterior pole of the eye is slightly excavated. All around the position of the papilla there is a circle of peripapillary chorioiditis, with pigment spots more abundant to the temporal side. To the nasal side there is a small pearl-white spot with a touch of pigment at its lower end. The central vessels, of normal caliber, leave the excavation of the posterior pole ascending beside the white mass before spreading out upon the retina. The macular and paramacular region presents an accentuated dark color.

If we study the work of Lagrange on injuries of the orbit by the projectiles of war, we find that author describes a proliferating chorioretinitis which

differs from simple proliferating retinitis in the following respects:

1. The proliferating chorioretinitis follows a hemorrhage and a rupture of the deep membranes.

2. It presents also the form of a fibrinous plaque, which is of more regular thickness and more localized than the multiple membranous prolongations arranged in the form of a web, extending over a great part of the fundus of the eye, that characterize proliferating retinitis.

3. This plaque is everywhere opaque, whereas the membranes of proliferating retinitis are translucent at certain parts.

4. The plaque of proliferating chorioretinitis has a simple relation of contact with the vitreous, and does not have the free extensions of the other form. Its surface is even and has only a moderate prominence.

5. The usual location of the proliferating chorioretinitis is the macula, the papilla and its vicinity.

6. It is almost always accompanied by a focus of pigmentation.

7. It is not accompanied by a detachment following the proliferation which, on the contrary, fastens the retina to the choroid.

The ophthalmoscopic picture of our case presents all the characters described by Lagrange. Anatomically, as pointed out by Lagrange, there occurs the organization of a choroidal hemorrhage following rupture of the choroid and retina, marked by the proliferation of the connective tissue of the choroid. These ruptures are sometimes

accompanied by avulsion, partial or total, of the optic nerve. In our case it may be questioned if there was avulsion of the nerve, or simply peripapillary partial rupture of the retina and choroid. We believe the latter the more probable lesion, because of the distribution of the vessels of the retina being altogether normal. The white spot situated on the nasal side might well be a tear in the choroid.

What is the mechanism of the lesions? Gonin thinks that a blow on the eye can cause a partial avulsion of the optic nerve, indirectly by a sharp rotation of the globe. The optic nerve suffers strong flexion at the level of the scleral ring, and part of the optic fibers are broken. This exaggerated flexion can also produce a rupture of the membranes at the border of the optic disc.

According to Lagrange these lesions may be due to a concussion of the bones of the face. As he says "the eye is lifted up, shaken, in the same manner as a ship is shaken by a ground-

swell arising under its bottom. It is quite probable that this concussion of the entire adipose system (or better said of the fatty mass almost fluid at the temperature of the body) is the cause of the ruptures taking place in the inner membrane."

How can we understand that these disorders are often exclusively macular and that when rupture exists elsewhere, the most important lesions are to be found at the posterior pole? It is possible to explain such a localization; first, by the fact that the macular region is the most delicate and the most liable to injuries and traumas; secondly, and especially because the eye, shaken, tossed, thrust forward as it is by the oscillating wave arising in the interior of the orbit, is held back, twitched, by the optic nerve firmly fastened to the apex of the orbit.

These twitching motions act chiefly on the entire posterior pole; and, for this reason, the ruptures and hemorrhages are easily produced in this particular spot.

LITERATURE

1. Gonin. *Encyclopedia Francaise d'Ophtalmologie*.
2. Lagrange. *Atlas d'Ophtalmologie de Guerre*.
3. Lagrange. *Les fracture de l'orbite par projectiles de guerre*.

MICROSCOPIC FINDINGS IN A CASE OF ASTEROID HYALITIS.

F. H. VERHOEFF, A.M., M.D.

BOSTON, MASS.

(From the Massachusetts Charitable Eye and Ear Infirmary.)

This reports a case in which the condition was recognized clinically and the eyeball afterward removed for hemorrhagic glaucoma. The histologic examination and microchemic tests seem to indicate that the opacities consist chiefly of calcium soaps and calcium carbonat with some fatty or lipoid substances; and that their formation depends on angiosclerosis, with an altered condition of the blood.

The name asteroid hyalitis was given by Benson in 1894 to a condition in which there occurs within the vitreous humor numerous brilliantly white globular opacities. The condition had been previously recorded in the literature but not recognized as a clinical entity. No doubt it often has been mistaken for synchysis scintillans, from which, however, it is easily distinguishable by the shape of the opacities and the absence of the glistening reflexes characteristic of cholesterol crystals. Holloway¹ has recently collected nine cases of asteroid hyalitis from the literature and added four cases of his own. He summarizes the 13 cases as follows:

"Of these 13 patients, 8 were males and 5 females; 11 were over fifty, 4 of these being over seventy; 1 thirty-five, and 1 was an adult, the age not being stated. In 2 instances there was bilateral involvement; in 7 the right eye only was affected, and in 4, the left eye. As to syphilis, one acknowledged the disease, one had a positive Wassermann, and in three this test was negative; all were presumably serum test. The associated ocular conditions have included lenticular opacities, signs of inflammation of the uveal tract, optic atrophy, and glaucoma, and, if D'Oench's patient be included, detachment of the retina."

I may add that in one case, a bilateral one, there was sclerosis of the retinal vessels and profuse retinal hemorrhages in one eye. In three cases there were foci of old choroiditis. In no case was there evident liquefaction of the vitreous humor.

The case that I have to report seems to be the only one of this condition in which a microscopic examination of the eye has been made and in which

the opacities have been subjected to microchemic tests. The diagnosis was made by me from the characteristic vitreous opacities seen when the eye was opened after fixation in formalin. On looking up the clinical record of the case, I found that I had made the same diagnosis one and one-half years previously, when I had made an ophthalmoscopic examination of the patient.

CASE.

Thomas M., aged 75 at the time of operation, was first seen in the Out-Patient Department February 20, 1908, where he was examined for glasses. His vision was, R. +1.75S. =20/20, L. +2.00S. =20/20. No note was made as to the condition of the fundus or vitreous humor at this time.

April 9, 1918, he was seen by Dr. Verhoeff, who made a diagnosis of hemorrhagic retinitis, and asteroid hyalitis, right eye. The vitreous humor was not fluid. The vitreous humor of the left eye was free from asteroid opacities. The vision of the right eye was reduced to the ability to count fingers at three feet, that of the left eye with +2.25 S. was 20/20.

November 23, 1918, the condition of each eye was unchanged. There was no glaucoma.

May 24, 1919, the patient consulted Dr. F. M. Spalding privately, who states that the eyes were free from glaucoma. The vision of the left eye remained unchanged.

December 23, 1919, the patient developed acute glaucoma in the right eye.

December 31, 1919, the right eye was enucleated under local anesthesia by Dr. Spalding, and submitted to Dr. Verhoeff for pathologic examination.

PATHOLOGIC EXAMINATION.

Macroscopic: The globe, after fixation in 10 p. c. formalin, is of normal size and shape, measuring 25½ mm. in its antero-posterior diameter. The cornea is free from opacities. The anterior chamber is normal in depth and free from coagulum. The pupil is 2½ mm. wide. The lens is in situ. The retina and choroid are in situ. The retina shows numerous small punctate hemorrhages, most abundant in the equatorial region. Senile pigmentary changes are present at the ora serrata, but are not unusually conspicuous. The vitreous, normal in consistency, and free from blood, shows in its anterior half multitudes of minute white dots. These are fairly uniformly distributed, but show a tendency to occur in groups.

Microscopic: The cornea, normal; tissue of limbus shows very slight infiltration with chronic inflammatory cells. The root of the iris is firmly united with the ligamentum pectinatum all around. The anterior chamber contains a slight amount of blood adherent to the iris, and also at the bottom of the chamber. The iris is free from cellular infiltration, and shows slight fibrosis, especially at the root, where it is somewhat thinned, and contains a few clump cells. There is no ectropium uveae. A vacularized membrane extends over its anterior surface for about 1 mm. at the periphery, on one side only. There is no pupillary membrane. A few pigment patches on the surface of the lens indicate slight posterior synchiae. The ciliary body is not atrophic. The ciliary processes are congested and many of them show hyalin degeneration of their stroma. The pars plana ciliaris retinae shows very slight (senile) hyperplasia and slight senile pigmentary changes near the ora serrata. The lens shows slight cataractous changes in the anterior and posterior cortex as indicated by the presence of numerous vacuoles containing granules deeply stained in hematoxylin.

The retina shows numerous small hemorrhages in its inner layers, but is free from edema except on the nasal side of the disc where it shows a few

characteristic vacuoles. It contains no iron pigment. The macula shows marked changes typical of central senile retinitis. The layer of rods and cones is here completely destroyed while the pigment epithelium shows degenerative and proliferative changes with formation of hyalin tissue. Elsewhere the rods and cones and pigment epithelium are normal, and the latter



Fig. 1.—Asteroid opacities in vitreous humor as seen by reflected light. This gives a good idea of the ophthalmoscopic appearances.

has formed few if any colloid excrescences. The retinal ganglion cells have everywhere disappeared. The retinal vessels show marked endovasculitis. One vessel is found giving off new formed capillaries into the vitreous humor. In places new capillaries are also forming within the retina.

The optic disc is only slightly cupped. A few new formed capillaries are pushing into the vitreous humor from its surface. Within and behind the lamina cribrosa the optic nerve is completely atrophic and shows marked neuroglia proliferation and slight tendency toward the formation of cavernous spaces. Serial cross sections of the central retinal vessels show complete obstruction of both the artery and vein due to endovasculitis, the vein at

a point about $\frac{1}{4}$ mm. behind the lamina cribrosa and the artery a little further back.

The choroid shows marked venous congestion, and its vessels show marked endovasculitis affecting especially the smaller arteries, some of which are completely occluded. The chorio-capillaris appears to be intact even behind the macula. The mem-

vary in size from this down to a diameter of .009 mm. Some of them are almost exactly spherical in shape but most of them show some slight irregularity in outline. Under the oil immersion lens they appear finely granular, while their outlines present fine spicules suggesting that they contain minute needles.

When the vitreous is dried and



Fig. 2.—Group of asteroid opacities as seen by transmitted light.

brane of Bruch shows slight if any evidences of calcification.

The vitreous humor is free from blood and serum, and is unusually free from cells, showing only a few stellate epithelioid cells. In ordinary hematoxylin and eosin preparations, numerous faintly staining spherical bodies may be seen in its anterior half. These are far more easily seen in preparations made by placing a drop of vitreous humor on a slide and placing a cover glass over it. In such preparations the bodies appear dark brown with a greenish tinge by transmitted light (Figs. 2 and 3), and brilliantly white by reflected light (Fig. 1). They are scattered throughout the vitreous, but tend to occur in groups of one to three hundred or more. The largest measures .09 mm. in diameter, and they

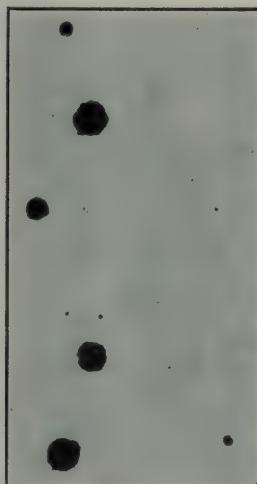


Fig. 3.—Large asteroid opacities as seen by transmitted light.

mounted in balsam, they become almost invisible by transmitted light and completely invisible by reflected light.

Attempts to crush the balls by pressure of the cover glass or by teasing them with needles, are unsuccessful. The balls are easily seen in unstained celloidin sections mounted in water. In such sections they are never seen in the anterior chamber, or in fact, anterior to the hyaloid membrane, and none is found in contact with the retina or ciliary body.

Staining reactions of the asteroid opacities: The balls fail to stain in eosin, acid fuchsin, carbol fuchsin, carbol-thionin, phosphotungstic acid hematoxylin, Mallory's anilin blue stain, and by Gram's method. They stain slightly after exposure of 20 minutes to a 7 per cent solution of potassium

permanganat. They stain slightly after prolonged exposure to Verhoeff's elastic tissue stain. They stain best after long exposure to a strong solution of alum hematoxylin. The staining however, is not uniform, some of the balls staining intensely, others faintly. In general, the larger the ball the deeper the staining, but some of the large balls stain faintly. The staining of each ball is usually diffuse, no structure being brought out, but there is a tendency for the periphery to stain more strongly than the central portion. Rarely a ball is seen which is composed of smaller balls, each having a diameter of about 20μ .

Solubility: The balls are insoluble in glycerin, alcohol, ether, chloroform, xylol, acetone, concentrated boiling ammonium hydrat, cold glacial acetic acid, concentrated nitric, sulphuric, or hydrochloric acid. They do not dissolve in a 10 per cent solution of potassium hydrat while being evaporated to dryness over a Bunsen flame.

Other microchemic tests: The balls fail to give the protein reaction with Millon's reagent. They also fail to give the Murexid reaction. They do not give the amyloid reaction with Lugol's solution, but stain slightly in this reagent. They fail to stain in a 2 per cent solution of silver nitrat. When treated with cold concentrated nitric acid they abundantly evolve bubbles of gas and are found to have lost their granular appearance when examined in water by transmitted light, and, to reflect much less light when examined by oblique illumination.

When exposed on a glass slide to the heat of a Bunsen flame for one minute they are apparently unaffected, except possibly slightly browned, altho the vitreous tissue with them is charred black.

When treated with concentrated sulphuric acid they fail to give the color reaction characteristic of cholesterol.

When a small drop of vitreous humor containing the balls is dried in air upon a slide and a minute drop of concentrated sulphuric acid applied, bubbles of gas are evolved and after a few

minutes the characteristic crystals of calcium sulphat are precipitated in enormous numbers.

When treated with Scharlach R. they give a fairly strong positive test for fat. These tests are made as follows: A small bit of vitreous humor containing the balls is dried in air on a slide. A few drops of a saturated solution of Scharlach R. in equal parts of 70 per cent alcohol and aceton are quickly placed upon them and a cover glass immediately applied. The cover glass is sealed with vaselin to prevent evaporation. The balls begin to stain in about 5 minutes and reach their maximum coloration in about 30 minutes. The same method is successful also with celloidin sections containing the balls. When treated in this way and examined under high magnification, the balls are found to be closely packed with smaller balls, each slightly larger than a red blood corpuscle.

A specimen of vitreous humor containing a large number of balls is dried on a slide and fixed thereto with thin celloidin. Treated with concentrated nitric acid one minute. Washed in distilled water. Allowed to dry. A drop of ether allowed to fall upon it and permitted to evaporate, then another drop of ether allowed to fall upon it and also permitted to evaporate. A solution of Scharlach R. in alcohol-aceton dropped upon it and a cover glass quickly applied. Numerous fat drops stained by Scharlach R. are now found in the vicinity of the balls, and the balls themselves are found to contain smaller balls which also are stained.

In preparations treated with a 2 per cent solution of osmic acid for 24 hours or longer, most of the balls are stained fairly strongly, but none is stained black as in the case of ordinary fat. Some of the balls remain almost, if not quite, unstained.

REMARKS.

With the exception of the unusually late onset of glaucoma, $1\frac{1}{2}$ years after the hemorrhagic retinitis was first observed, and the occurrence of the asteroid opacities, this was a typical case

of hemorrhagic glaucoma due to obstruction of the central retinal vein. The complete obstruction of the central artery no doubt was subsequent to the obstruction of the vein.

The chief interest in this case lies in the vitreous opacities. Seen with the ophthalmoscope, or viewed under the microscope by reflected light, they were identical in appearance with the opacities described by Benson and recently by Holloway. Since they were confined exclusively to the vitreous body, and none was even in contact with other ocular tissues, it is evident that they were not formed within the latter and later excreted, but that they were formed primarily within the vitreous body. The chemical composition of the balls, owing to the relatively small amount of material available, could be determined only with approximate exactness. The test with sulphuric acid showed conclusively that they contained a large proportion of calcium. This was evidenced also by the fact that, in general, they stained strongly in alum hematoxylin, after long exposure to the latter, while the fact that some stained much more strongly than others showed that their calcium content was not uniformly the same.

The fact that the balls evolved bubbles of gas in abundance when treated with strong acids showed that the calcium existed largely as a carbonat, and their failure to stain in nitrat of silver indicated an absence of calcium phosphat. That calcium was not their chief constituent, however, was clear from the fact that after treatment with strong nitric acid they retained their forms altho they were otherwise somewhat altered in appearance.

Their insolubility in ether and other fat solvents excluded free lecithin and cholesterol, but either or both of these substances may have been present in unusually firm and insoluble combinations. The presence of free fatty acids was excluded by the test with copper acetat. The tests with Scharlach R. showed that they contained a small amount of relatively free fat. After treatment with strong nitric acid, a

large amount of fat could be dissolved out of them by ether and demonstrated as fat droplets by Scharlach R.

It is safe to conclude, therefore, that the balls consisted chiefly of calcium soap, probably calcium margarat, possibly admixed with insoluble compounds of cholesterol and lecithin.

The question now arises as to the conditions which give rise to these peculiar vitreous opacities. It is well known that fats, fatty acids, lipoids, and lime salts, are apt to be deposited where there is deficient oxygen, for instance, in necrotic infarcts, and in scar tissue where the blood supply is insufficient. They are particularly abundant in old degenerated eyes, notably in eyes with long standing separation of the retina following inflammatory conditions. In these eyes the subretinal fluid is often loaded with such substances. It would seem, therefore, that one of the requirements for the formation of asteroid opacities is deficient oxygen in the vitreous body. This condition no doubt existed in the present case in which the retinal circulation was practically abolished and in which there was marked sclerosis of the choroidal arteries. The advanced age of practically all of the patients, in previously reported cases, suggests that angiogenesis of the intraocular vessels is the most important factor in all cases.

It is evident, however, that deficiency of oxygen is not always alone sufficient to account for asteroid hyalitis, for I have examined many eyes affected with hemorrhagic glaucoma in which vascular changes were even more marked than in the present case and have hitherto failed to observe such opacities. There must be, therefore, some other factors at work. These may reside in the blood, the latter possibly containing an excess of fats and lipoids in unusual combinations. An altered condition of the blood does not alone suffice to account for the opacities, because the latter were unilateral in all but two of the reported cases.

Holloway assumes that asteroid hyalitis and synchysis scintillans are closely related. This is probably true in a general way, because both evidently depend upon degenerative conditions of the eye. Yet

it is a striking fact that in only one case were cholesterol crystals found in association with asteroid hyalitis, and in this they were few in number.

In the hope of throwing further light upon the question, I examined the sub-retinal fluid from six degenerated eyes. In all six cholesterol and fatty substances were abundantly present, but in only one eye were there in addition balls identical in appearance with those of asteroid hyalitis. In this eye the fatty material was so abundant as to form a thick mush on the outer surface of the retina, and it was in this mush that the balls were found in large numbers. In the relatively clear serum away from the separated

retina the balls were absent although cholesterol was abundant. This observation suggests that in order for asteroid opacities to be formed a delicately balanced combination of factors must exist in the eye.

CONCLUSIONS.—The opacities in asteroid hyalitis consist chiefly of calcium soaps, calcium carbonat, and certain amounts of fatty or lipoïd substances, in combinations of various grades of stability.

Their formation is usually if not always dependent upon intraocular angiосclerosis in association with an altered condition of the blood.

MOOREN'S ULCER OF THE CORNEA.

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This is the report of a case in which the eye was removed for pain during the active course of the disease. The eyeball was subjected to careful histologic examinations and photomicrographs of sections made are reproduced. Candidate's Thesis submitted to the American Ophthalmological Society.

Enough cases of Mooren's ulcer of the cornea* have been reported since that first case seen by Bowman, and since the classical clinical picture was created by Mooren, to make the clinical side of the disease, in all its aspects, sufficiently familiar to ophthalmologists. But we are still considerably in the dark as to some sure and successful method of treatment, mainly because the question of etiology is entirely unsolved. A thoro understanding of the underlying histologic changes would greatly advance our knowledge in this direction if we had more and exhaustive histologic reports.

The only authors reporting on this question are: Lawford, Krey, Hillemanns, Schmidt-Rimpler, Asayama, Lister, Kiribuchi, Ogiu, Hayashi, de Schweinitz, Rochat, Ichikawa, Epalza, Mayou, Masuda. Not all of these reports, however, are quite satisfactory because in a disease so often malignantly progressive excision of a small piece of the advancing ulcer edge is of no sufficient help to arrive at the correct understanding of the condition, and because the eye would present only the last stages of the process when its condition would make removal of the whole eye necessary. To add to the knowledge of this side of this strange disease is the purpose of this communication.

CASE HISTORY.

Patient Ben B., farm laborer, colored, aged 28 years, called at the Out Patient department of the Charity Hospital September 5, 1917, complaining that his left eye had been inflamed and the sight failing for one and one

half months. At this occasion a small crescent shaped ulcer of the left cornea at the lower nasal limbus was found. Vision R.E. 20/20; L.E. 20/70. He soon absented himself from observation until November 23, 1917, when he returned because the pain in the left eye had been more severe for a week. The left cornea appeared somewhat smaller and irregular in outline and a crescentic ulcer surrounded its lower margin, beginning about 4 mm. above the horizontal meridian on the nasal side and ending about 1 mm. above the horizontal meridian on the temporal side. The ulcer was 2 to 2.5 mm. wide at its widest place, below, and was truly crescentic having narrow pointed ends adjoining the nasal and temporal limbus respectively. Its limbus margin was slightly sinuous; the corneal margin on the other hand, formed an almost continuous uniformly curved line.

The corneal edge of the ulcer was very steep, perpendicular, and gave the impression of being slightly undermined here and there. The floor of the ulcer was uneven and fairly translucent, greyish; here and there, especially near the pointed ends, a small yellowish necrotic mass was seen on the floor; in several places blood vessels from the limbus extended onto the floor of the ulcer. In other places the floor was covered with a thin gelatinous mass like granulation tissue. The remaining cornea was almost perfectly clear excepting for a thin, bluish, faint and uniform opacity at the corneal margin of the ulcer. The epithelium was slightly defective, and this only in the area adjoining the edge of the ulcer. The

*The term "rodent ulcer" without any further qualifications such as Mooren's ought best be avoided as leading to confusion. Thus Davidson's paper on Radium Treatment of Rodent Ulcer (Trans. Ophth. Soc. U. K., 1906, vol. XXVI, p. 303) has erroneously been quoted among the literature of Mooren's ulcer, tho dealing with epithelioma only. "Chronic serpiginous ulcer" is also likely to create confusion.

whole cornea gave the impression as if it had become ectatic and the anterior chamber was deeper below because the thin floor of the ulcer had given way to the intraocular pressure. The cornea was markedly anesthetic. Iris and pupil were apparently normal. Tension normal to palpation. (Fig. 1.) Vision 5/30.

Bacteriologic examination of smear and culture as well as blood Wasserman



Fig. 1.—Clinical appearance of Mooren's ulcer of the cornea. Feingold's case.

mann were negative. No examination for intestinal parasites was made. In spite of various modes of treatment such as Optochin, 1% Balsam of Peru ointment, tincture of iodin, 2% nitrat of silver, electric and thermocautery applied locally at different periods, and internal treatment with mercury and iodides, the condition grew continuously worse and patient suffered intensely at times. More than once did it appear as if the new treatment instituted was going to give good results but the hopes were each time only short lived. For external reasons no transplantation of the conjunctiva could be done.

The ulcer continued to extend more and more around the cornea until only 3 to 4 mm. at the upper limbus appeared intact; at the same time more and more of the cornea, in a central direction, had been destroyed making

the ulcer steadily wider while the conjunctiva of the limbus advanced onto the floor of the ulcer in some places. Hypopyon appeared at different times and a pupillary exudate was noted. Vision became reduced to counting fingers at 30 cm. January 25, 1918 the patient experienced the severe pain of perforation of the cornea; on the next day the anterior chamber was shallow, the pupil appeared pear-shaped with the point in the lower nasal quadrant, tho the seat of the perforation was invisible on account of its smallness. Already, January 30, 1918 further invasion of the cornea was again noted and with it return of the severe pain.

The patient's often repeated and insistent demand for enucleation had to be granted February 1, 1918. During the subconjunctival injection of the anesthetic the patient squeezed the lids with the result that iris, lens, vitreous and retina escaped thru the widened perforation in the lower nasal quadrant. Enucleation completed, the eye was immediately placed in Zenker's solution; after hardening it was bisected in the equator and prepared for sectioning after Lee's Dry Celloidin method. Of the anterior half, serial sections were made parallel to the vertical meridian; of the posterior half horizontal sections.

HISTOLOGIC EXAMINATION

The epithelium of the conjunctiva of the eyeball contains a number of goblet cells, becomes more normal at the limbus showing the pigmentation typical for the negro. The conjunctiva contains numerous vessels filled with blood, all with normal walls; no thrombosis anywhere. Large accumulations of plasma cells are seen everywhere; lymphoid cells are much less in evidence and appear either in the form of diffuse arrangement or in the shape of round nodules lying in the midst of the plasma cells; these round foci often show at the same time fine capillaries and a few cells with large, pale and vesicular nuclei. Only single eosinophiles are to be found. Leucocytes are found only near the places where the corneal process is active and here

they are seen lying in the midst of the plasma or lymphoid cells; this relation is best seen near the youngest part of the process. Near the seat of the perforation leucocytes penetrate all layers of the conjunctiva including the epithelium. The conjunctiva has advanced over some portion of the ulcerated cornea covering the thin remaining portion of it unaffected by the process. The sclera shows the typical folding resulting from the collapse of the eye

At the perforation the remaining cornea has a peculiar club-shaped appearance in the cross section due to the fact that the wound portion makes a sharp curve toward the anterior chamber and because at the ulcer edge the cornea has at least twice the normal thickness. The epithelium forms a comparatively even surface leveling the slight irregularities in the cornea and Bowman's membrane. It consists of three to four layers of very flat epithe-

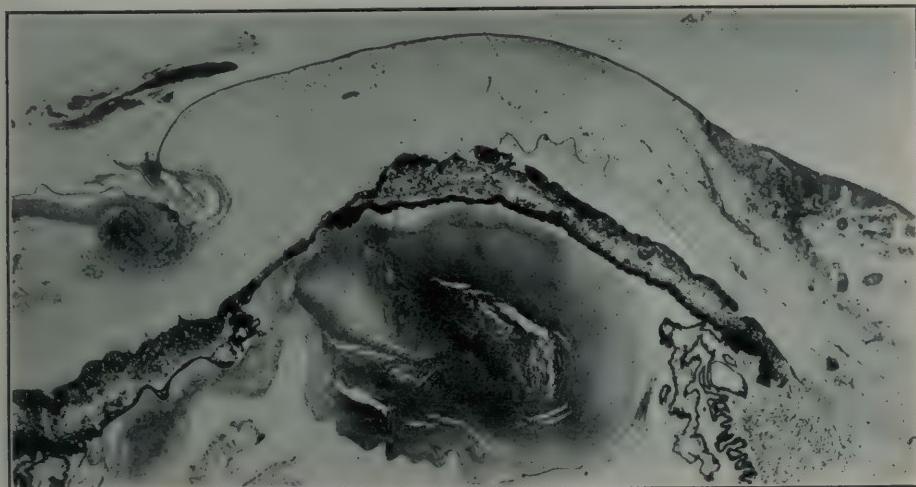


Fig. 2.—Section thru cornea on temporal side of perforation. Above beginning ulcer; below healed ulcer with granulation tissue and giant cells; over-hanging, thickened corneal edge; lens capsule, etc., in front of cornea. X 12.

during the operation. Many vessels in the sclera are surrounded by dense plasma cell infiltration while only some show a lymphoid cell mantle. (Fig. 2)*

Owing to the perforation and also to the bulging of the thin, ulcerated cornea the corneal curvature is markedly increased, and the cornea shows the typical folding of the posterior surface. Only in a short area at the upper limbus is the cornea unaffected and continuous with the remaining central portion; the periphery in the other parts of the cornea is occupied by the ulcer, the floor of which consists of a few unaffected posterior layers partly covered by the conjunctiva, while thru a break in the lower nasal quadrant lens, retina and iris project.

lium in which only the basal layer shows distinct nuclei while the others appear more dry, horny and uniform.

At the ulcer edge the epithelium is often suddenly increased to five or six times in thickness appearing decidedly club-shaped; it covers the corneal edge only loosely; a clear space between it and the underlying cornea exists in several places and it is at times folded back on its self; the cells are irregularly polygonal, succulent and nearly all show distinct nuclei; a few cells are hydropic, edematous and have indistinct nuclei; some are separated by edema here and there and leucocytes lie between others. Bowman's membrane is intact and covers the whole cornea up to the edge of the

*All microphotographs were made by Mr. Max Poser of the Bausch & Lomb Optical Co., to whom thanks are due for his patient skill and unselfish kindness.

ulcer. One or two deep corneal vessels surrounded by lymph cell infiltration are seen near the upper limbus.

The corneal parenchyma stains more deeply in the portion near the limbus and much paler near the edge of the ulcer. This is due to more dense and regular arrangement of the lamellae in the periphery and to the more loose, wavy and separated arrangement of the lamellae in the portion near the ulcer. In addition there is unmistak-

gin marked infiltration with leucocytes exists, while a short distance from and around the beginning ulcer diffuse and not very dense infiltration with leucocytes can be noticed. In this latter place eosinophiles are rather frequent among the infiltrating cells. All stages of the process can be studied in the different sections, from the very beginning thru the more advanced and more extensive ulcer to the stage of the ulcer healed and covered by the



Fig. 3.—Beginning ulcer; epithelium still continuous over infiltration which contains giant cells.
X 65.

able waviness, vacuolation and uneven staining within each lamella near the ulcer edge. The corneal corpuscles are slightly more numerous than normal thruout the cornea and higher magnification often shows two or three nuclei in each space which show no very great differences in their staining qualities. This peculiar behavior of the corneal corpuscles and infiltrating cells must apparently be interpreted as a diminished ability to take the nuclear stains, either from partial necrosis or some form of edema. Near the ulcer some of the nuclei are decidedly edematous.

No marked infiltration with lympho- or leucocytes exists anywhere except, and here only slightly, near the ulcer margin which accounts well for the remarkably faint opacity of the ulcer margin and for the clearness of the whole cornea observed clinically. Near the active and progressing ulcer mar-

conjunctiva of the eyeball and granulation tissue.

The first beginning can be seen near the upper limbus. (Fig. 3.) Here the epithelium of the limbus becomes somewhat irregular, projections of the epithelium are seen in the depth of the conjunctiva, in the shape of little islands the cells of which are often showing an arrangement bearing a distant resemblance to that found in epithelioma. The cells are slightly separated by edema, small vacuoles appear between them, the nuclei stain less deeply and leucocytes lie between the epithelial cells. Underneath this affected but still unbroken epithelium lies a focus of dense infiltration in the conjunctiva and the adjoining corneal parenchyma, consisting of polymorphonuclear leucocytes with a few lymphocytes and most of the time one, or more giant cells at the corneal edge of the focus in the conjunctiva. Some

free red corpuscles between the infiltrating cells seen here may be attributable to the operation.

The cornea appears as if eroded by the infiltration, free blunt ends of the corneal lamellae project into the edge of the focus in the conjunctiva; the lamellae appear fibrillated, teased out and broken up into smaller and thinner layers; leucocyte accumulation extends for a short distance towards the center between the lamellae and their fibrillations.

Soon the epithelium breaks down over

which is continuous with the floor of the ulcer soon shows a slight breaking down—the first beginning of the undermining groove and overhanging edge. Where the process is oldest, in the lower nasal quadrant, all but a very few of the most posterior lamellae have been destroyed; they have resisted the intraocular pressure for quite sometime, until the final breakdown causing the perforation; the wavy teased out and thin ends of the lamellae at the perforation clearly testified to this.

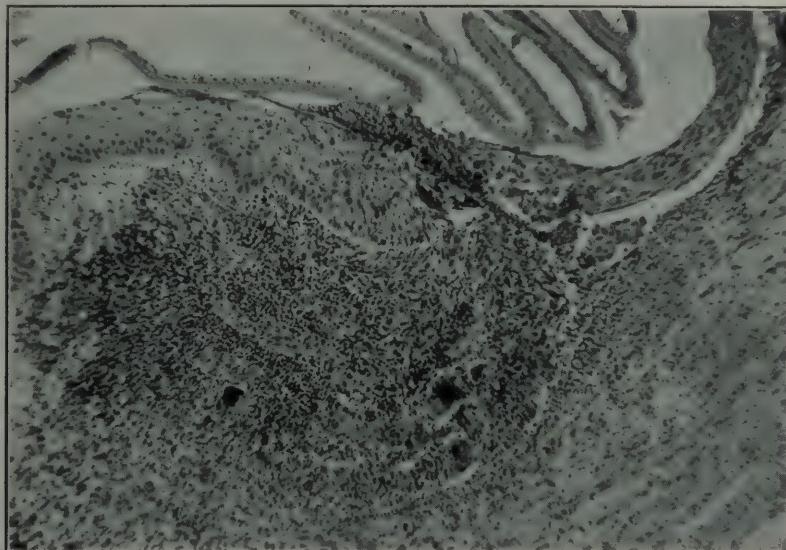


Fig. 4.—Healed ulcer; conjunctival epithelium with granulation tissue cover corneal remnants; giant cells between cornea and granulation tissue. X 65.

the focus, the infiltrated conjunctiva and cornea are at least partially thrown off and an open ulcer is the result. How the process further invaded the cornea in a central direction and how the overhanging edge of the ulcer was produced can be studied excellently in the area near the perforation where new invasion of the cornea was noted on January 30, 1918. Here marked intense infiltration with leucocytes is suddenly seen in the perpendicular corneal edge of the ulcer. From this infiltration a dense band about $1/5$ the thickness of the cornea extends in a central direction for about 1 mm. between the anterior and posterior layers of the cornea. At the posterior side of the infiltration the part of the cornea

other sections, on the contrary, show arrest of the process, regressive changes and attempts at a cure, all of which had already been noticed clinically. (Fig. 4.) These conditions can be seen both at the limbus and at the corneal side and are somewhat different in details at the two edges of the ulcer. As soon as the oldest ulcer portions, at the limbus, have become cleared of all detritus and necrotic material the infiltration of the remaining cornea diminishes rapidly, and the epithelium of the conjunctiva bulbi begins to cover the floor of the now healing ulcer. As the healing advances towards the center of the cornea numerous capillaries, cells with large vesicular nuclei, lymphoid and plasma cells and one

or more giant cells appear under the epithelium of the portions already covered—real ingrowth of granulation tissue from the conjunctiva of the eyeball. That the epithelium is entirely derived from the conjunctiva of the eyeball is evident not only by its continuity with it but by the appearance of the cells, especially by their marked intercellular bridges (prickle cells).

Close study of the sections proves that epithelium and granulation tissue

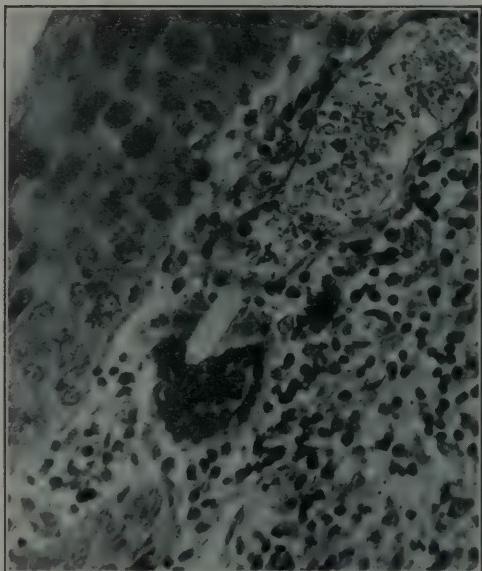


Fig. 5.—Foreign body in giant cell lying immediately beneath epithelium. X 520.

were covering the floor of the ulcer even in those places where clinically the floor of the ulcer appeared clear. Where the corneal edge of the ulcer has cast off all the infiltrating cells, the cornea, as mentioned above, appears decidedly thicker than in the normal periphery, takes the stain less well and the whole structure is decidedly different; the overhanging edge becomes covered by corneal epithelium, which is not permanently adherent to the underlying cornea and is arranged in many layers. These cells are more or less irregular in outline and arrangement and are often hydropic and edematous; they never show any intercellular bridges.

Where the overhanging ulcer edge joins the healed portion one can see the

two forms of epithelium, different in character and arrangement, meet and pass into one another thru a very short transitional portion of greatly disarranged irregular cells bearing the characteristics of neither side. (Fig. 4.) Underneath the epithelium the overhanging edge shows a thin intermediary layer of irregularly arranged connective tissue best seen with Mallory's connective tissue stain because staining paler than the adjoining cornea. Adjoining this layer the corneal lamellae end abruptly and contain only few leucocytes between them. Between the free ends of the corneal lamellae and also for some distance towards the center as well as to some extent in the intermediary layer are found triangular, club-shaped, polygonal and spindle like cells, each with a large, well staining nucleus and a large amount of deep staining cytoplasm. Some of these keratoblasts seem to contain more than one nucleus. No mitosis could be found.

THE GIANT CELLS: They are always found in two places only—at the beginning and progressing ulcer (Fig. 3), and at the point where conjunctiva and granulation tissue cover the cleaned floor of the ulcer. (Fig. 4.) No giant cells are seen near the region of the keratoblasts at the healing corneal edge. Up to ten or twelve giant cells are seen in each section. They are always found only at the corneal side of the infiltration in the conjunctiva or of the ingrowing granulation tissue. The cells are small or larger, round, elongated, irregular or polygonal, and have only a few or over twenty deep staining nuclei. Almost all the time the nuclei are marginal; at times they are more in the center. The histologic details lead to no conclusion as to their origin or significance. They show no typical relation to other cells and are seemingly free in the midst of the leuco- and lymphocytes on the corneal side of the exudate or granulation tissue. No cells resembling endothelial cells are found in the infiltration of the incipient ulcer. A few cells were seen which were each enclosing what appeared as a cell with clear vacuolated plasma and no nucleus, apparently a leucocyte. In one instance a homogeneous rod-like, color-

less structure was seen to indent the edge of a giant cell or possibly to lie in it. But this one cell is apparently different from all others, since it was found directly underneath the epithelium at the beginning ulcer (Fig. 5).

THE ENDOTHELIUM shows nothing abnormal. The anterior chamber contains some granular coagulum with leucocytes. The prolapse of the iris in the lower nasal quadrant is covered by a slight amount of fibrinous exudate with numerous leucocytes. Thru the perforation, lens, retina and vitreous have left the interior of the eye and are in part seen to lie in front of the cornea. In the anterior chamber the iris shows the picture of intense hyperemia typical of perforation and two or three small foci of lymphoid cell infiltration. Those greatly in contact with the cornea at the angle of the anterior chamber the iris does not seem to be adherent there and its position is probably entirely the result of the corneal perforation. In the pupillary area a dense granular exudate covers part of the anterior lens capsule. The lens capsule is normal and only slight disturbance can be made out in the cortical layers of the lens. Ciliary body, retina, choroid and optic nerve offer nothing pathologic, aside from the changes due to perforation such as hyperemia, etc. Staining for bacteria and especially tubercle bacilli was negative.

COMMENT.

The long protracted and relentlessly progressing process in the cornea accompanied by the severe pain observed clinically and the histologic findings leave hardly any doubt as to the classification of the case. It is true Mooren's ulcer is coupled in the minds of most of us with the idea of an ulcer that does not perforate but this notion is only partially correct. Perforation of the ulcer is comparatively rare but undoubtedly cases of this disease are on record in which perforation had been observed.

The case contains the early beginning of the ulcer and all the histologic details which help us observe the progress of the ulcer from its very ini-

cipency, how the process continues to destroy the cornea in both directions, around the limbus and towards the center, and how parallel with it attempts at healing occur, repair being initiated by the conjunctiva of the eyeball growing onto the floor of the ulcer as soon as the necrotic material had been cast off by the invaded cornea.

No histologic characteristics can be found in the cases so far reported, nor in the present one, to explain why this disease almost always progresses only on the surface of the cornea and only rarely destroys the deepest layers. In Axenfeld's case, reported by Epalza, perforation occurred in consequence of an intercurrent diplobacillary infection. Neither in the case here reported nor in those reported by others has such complication been established. But it is not so difficult to imagine that secondary infection may have occurred with this or some other microorganisms. Negative examinations for bacteria would not greatly speak against such an assumption. In the present case also the corneal remnants in the lower nasal quadrant, tho few and thin, held out for a very long time and gave away to the intraocular pressure only after the process had reduced them greatly in resistant qualities, as shown by the thin wavy ends of the corneal lamellae at the perforation.

As in the case reports of others no etiologic factor could be established in the present instance. The Wassermann was negative as were also the bacteriologic examinations during the illness and of the histologic specimen. While an examination for intestinal parasites was omitted, it must be borne in mind that the coincidence of such parasites and Mooren's ulcer in the case of Hayashi is to be looked upon as a mere coincidence owing to the frequency of intestinal parasites in Japan. The eosinophilia found in the present case was only of a very slight degree and only in an area surrounding the beginning ulcer. The general health of the patient seemed extremely good, and no special search for tuberculosis was made. The case report of Mori, only accessible in the title, might

possibly contain pointers in the direction of tuberculosis having some relation to the disease.

The histologic details in the case show many features in common with the cases already on record, but at least one new feature can be added to the histologic picture of the disease by this report. The most striking detail of the case is undoubtedly formed by the abundant number of giant cells found in each section. It is to be borne in mind that they are already found in the earliest beginning of the infiltration, where they occupy a position between the infiltration in the conjunctiva and the affected cornea, and also in the places where conjunctiva and granulation tissue had advanced onto the floor of the ulcer. But they are conspicuously absent at the corneal edge of the ulcer where the cornea had become entirely cleared of necrotic material and invading leucocytes. They seem to lie free in the midst of the tissues, almost riding on the ends of the corneal lamellae and there is no characteristic arrangement of the tissue elements around them. Absence of endothelial cells is especially noticeable near them, they are surrounded by lymphocytes and leucocytes only.

Necrosis in the form of diminished staining qualities is entirely absent in all places where giant cells are found. The presence of the giant cells may possibly indicate some scavenger function of these cells. This would explain their presence in the only two places mentioned: At the beginning ulcer they would lie at the blunt free end of the corneal lamellae in the act of carrying off detritus from these tissues while at the more healed places where the conjunctiva had grown over, their presence would indicate that tho the conjunctiva had already grown over the cornea the detritus had not been entirely cleared away before that had occurred. Their presence in the second place will also explain partly why the healing in all the cases reported is

so often interrupted by relapses if we assume that the advancing conjunctiva had migrated onto the cornea too hastily, so to say, before the cornea had been entirely cleared of all necrotic material and of all microorganisms which we must assume to cause the disease. From such islands still containing the supposed virulent microorganisms fresh infection in a central direction can be imagined to occur, because the avascular cornea can resist poorly; the healed and covered over portion can resist a fresh attack better, and can even overcome it because of the vascularity of the granulation tissue. This of course gives no explanation why the process advances first in the deeper layers producing the undermined edges and why the most posterior layers are in most cases so immune to the process. The undermining of the conjunctiva bulbi first observed by Gifford might possibly be explained as an unusually tenacious process, where destruction extended onto the sclerotic from just such infected islands, in spite of the adjoining vascularization and granulation tissue.

A lesson as to the method of treatment might possibly be derived from the presence of the giant cells. If the above explanation corresponds to the facts as to the invasion then thorough destruction of all invaded cornea and sclerotic must be practiced. Even the portions already covered by conjunctiva and granulation tissue must not be spared if we want to destroy all seed for any further spread of the disease. We would thus have the theoretic explanation for the empirically adopted and fairly successful method of treatment by excision, curettage and cauterization. If healthy mucous membrane, such as from the lips, vagina or prepuce, could be transplanted onto a cornea and sclera thus thoroughly disinfected it might prove preferable to the conjunctiva bulbi, which is always likely to be contaminated with the causative microorganism.

The paper of Koepp, "Ueb. Heil. zw. Ulc. rod. Corn. durch Tuberkulininjekt. nebst. Bemerk. ueb. d. mikroskop.-anatom. Unters. e. dritt. Falles," Zeitschr. f. Augenheilk., XXXVIII, 1917, p. 301, was not available, due to conditions resulting from the war, until some time after the paper had been finished.

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MICROSCOPY OF THE LIVING EYE WITH THE SLIT LAMP OF GULLSTRAND.

ROBERT VON DER HEYDT, M.D.

CHICAGO, ILLINOIS.

This paper calls attention to the method of examining the eyes by the corneal microscope under illumination of the Gullstrand slit lamp. It gives a review of the most striking phenomena revealed by this method of examination. Read before the Chicago Ophthalmological Society, November 15, 1920.

The introduction of the slit lamp by Alvar Gullstrand in 1911 has opened an entirely new field for diagnosis and clinical observation to ophthalmology. The literature has been enriched by hundreds of reports by more than a score of investigators in this new line of research.

Foremost among these are L. Koeppe of Halle, and A. Vogt of the University of Basel. The latter has in preparation an atlas showing in 376 or more illustrations, most of them microphotographs in colors, various normal and pathologic conditions, heretofore established only anatomically, which may now be directly observed in the living eye. Many new facts have been established which were unknown, or not demonstrated. Owing to the delicacy of the anatomic parts, the latter were at times destroyed in the process of fixation, or we were unable to further differentiate their detail by any method of staining. The text of this atlas has been translated into Italian by Verderame, into French by Koby and Darier, and during the past year I have had the privilege of translating it into English, for the author.

Corneal microscopes, monocular as well as binocular, have been obtainable for many years, but owing to the imperfect and low degree of illumination furnished, have had but a limited field of usefulness. The stereoscopic binocular microscope now has attained full practical value by being combined with the slit lamp of Gullstrand. This combination of the two instruments is an achievement of Prof. Henker of the firm of Carl Zeiss.

The types of illumination adapted to the slit lamp have been of several kinds. The Nernst filament has until recently been used by most investigators. Vogt

has also adapted an arclight. Lately another type, the Wolfram spiral, enclosed in a bulb containing nitrogen, has been utilized, because of its greater intensity of light.

The light after passing thru a double lens is focussed onto a narrow slit diaphragm. It then passes thru a larger diaphragm and lens of about 7 cm. focal power, and by this is projected onto the eye. By these means the concentrated, nearly homogeneous, sharply circumscribed, quadrilateral beam of light, is practically freed of aberration.

By the means of various combinations of oculars and objectives with the microscope a series of magnifications of the area under observation, ranging from 9 to 108 times may be attained. With the highest magnification, however, the physiologic oscillation of the eyeball becomes objectionable and interferes somewhat with accurate observation.

The microscope is mounted on a base adjustable forward and backward, as well as from side to side, by rack and pinion. Chin support and head rest for the patient are essential.

Various methods of observation have been used.

By direct focal illumination the tissues appear in their natural coloration and form.

In diaphanoscopy the tissues are transilluminated by reflection of the light from a surface beyond the object under observation. Vogt also has described very fully the study of the reflected image of the light on the various limiting surfaces of the media, such as the anterior and posterior surfaces of the cornea, the lens and capsular surfaces, and the several nuclear limiting areas within the lens.

These reflections of light from limiting surfaces are often seen when using the ordinary ophthalmoscope, and especially the reflection on the anterior corneal surface is considered an annoyance. With the slit lamp method they may, however, assume a sphere of decided usefulness. When a micro-

stereo-microscopically under a magnification as high as 70 times, and the angle of the anterior chamber under one of 40 diameters. By the insertion of two Nicol prisms Koeppen also makes observation in linear polarized light.

I will now give an abbreviated out-

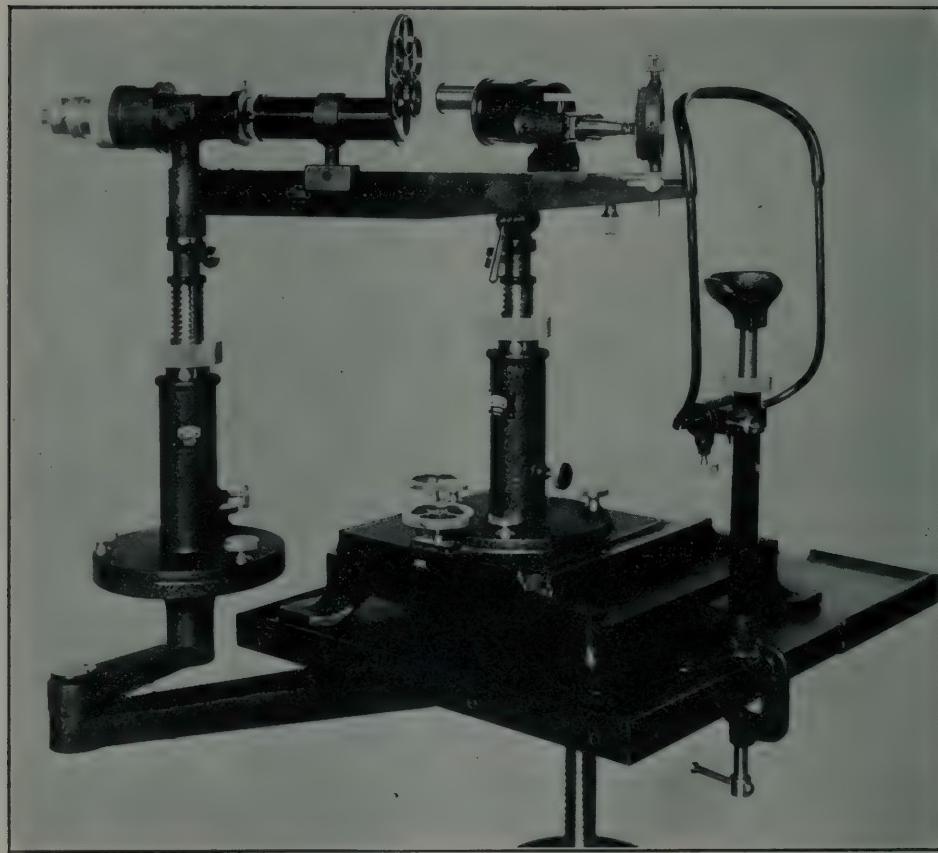


Fig. 1.—Combination of corneal microscope (on column in center). Slit lamp (on column to the left). Both directed towards face rest on the right.

scope is exactly focused onto them they disclose a world of information regarding the minute structure of these various limiting surfaces.

Microscopic measurements of the size of objects and the exact determination of their depth within the various media is now possible.

Koeppen has applied a contact glass to the eyeball, wherewith the curvature of the cornea is eliminated. In this way the retina may be studied

line of some of the findings made with these new instruments, many of which I have recently been able to verify.

The limbus presents a whorl of vascular loops and arcades, with their convexity toward the cornea. The greater part of these vessels are normally empty. By transillumination the blood current may be easily seen under high magnification. At times in certain vessels, the current comes to a standstill and it has been seen to reverse itself.

In many individuals, especially below the cornea, there is a radiating series of straight tubular structures, which Vogt has termed the palisades. They each contain a vessel, a vas afferens, and represent the superficial arterial pathway to the vascular loops at the limbus.

At the corneal border a physiologic dew-like infiltration of the cornea may be noted. This is composed of fine droplets about the size of the epithelial cells. According to Vogt this phenomenon in all probability represents an increased saturation of the peripheral epithelial layer with a nutrient fluid.

Isolated areas of dew-like changes on and in the epithelial and endothelial layers of the cornea are common pathologic findings, seen with the slit lamp.

When focussing onto the cornea, the anterior surface manifests its approach by the appearance of small ringlets and dots, which are movable. These are the corpuscular elements in the lacrimal fluid, and they may be greatly increased in numbers by rubbing the eyelids. The corneal substance, owing to its varied anatomic components which latter all present different refractive indices to one another, is diffusely luminous. This luminosity increases with age.

Within the corneal substance, superficial and medial, never in the deep layers, are the nerve fibers. They as a rule are dichotomously branched and often show a medullation for a short distance inward from the limbus.

Of the precipitates on the posterior corneal wall and of the clouding of the aqueous in iridocyclitis pages of descriptive matter could be written. The beauty of synechia can only be appreciated when seen. I have had the opportunity to carefully examine many cases of this kind stereomicroscopically under as high as a 40 times magnification, with the slit lamp.

In a case of nearly quiescent interstitial keratitis I saw numerous long blood vessels within the corneal substance. Most of these were empty. In one larger vein I saw the blood as it flowed, and could see each and every

individual red cell as it rolled along. In the reflex image of the posterior corneal wall I could see the endothelium, each individual living hexagonal cell, forming a yellowish mosaic.

Vogt has noted an increase in the opacification of that corneal zone, which is later involved by the arcus senilis, as early as after the third decade of life. A fully developed arcus senilis shows that the lucid interval which separates the gerontoxon from the limbus, is clear only in the superficial corneal area. The opacification of the deeper area is continuous to the limbus.

The vascularization from the limbus extends into the superficial zone only, hence its prolonged immunity to clouding.

In iridocyclitis I have seen glassy tenacious droplets extruding themselves, especially at the pupillary border. F. Schieck has reported an exhaustive study of these changes within the anterior chamber. In cases of serous iridocyclitis he describes small glassy pears, which form masses like frog eggs, or they may be so delicate as to appear as a spider web like cloud. This sticky material interferes with the outflow of the aqueous thru the pectinate ligament into Schlemm's canal, hence the tendency to secondary glaucoma, manifested by the deepening of the anterior chamber and tension, in this type of inflammation.

One of the most beautiful phenomena I have seen with the slit lamp is the process of dilatation and contraction of the pupil under low power. The rounded edge of the pupillary border is rolled in and out somewhat as when a curtain is wound over a pole. During dilatation for instance, posterior areas appear from behind the pupil, and roll forward onto the iris, on account of the contraction of the superficial muscles. The stroma is most artistic in its balcony and lattice-like formation when seen in the perspective.

A depigmentation of the pupillary cells of the iris, so that over large areas the pigment has been denuded, leaving only a pigment free, honey-comb-like hollow framework, or translucent crust

is described. Part of this pigment is precipitated to the angle of the anterior chamber, and this process has been construed as predisposing to glaucoma by Koeppe.

Vogt, however, is certain that this depigmentation is a senile phenomenon and describes the development of newly formed islands of pigment deposit under the stroma as part of this process. I have seen several cases showing this depigmentation in certain areas.

With slit lamp illumination senile cataract manifests itself in its incipiency by an iridescence of the layer directly under the capsule, and those bounding the senile and embryonic nuclei. Senile changes are not subcapsular as is generally supposed, but involve the whole of the cortex. In most cases the nucleus remains comparatively clear, so that apparently fully mature cataracts may be opaque only in the cortical substance. In very advanced cases a subcapsular surface area containing vacuoles is discernible.

A sharp point of differentiation between senile cataract and complicated cataract has been brought out by Vogt, by the aid of the slit lamp. Complicated cataract in its very incipiency shows a posterior subcapsular iridescence, and at times later an anterior subcapsular iridescence. These changes are found long before we can see any clinically diagnosable changes in the dishpan area under the posterior capsule, by focal light with the ophthalmoscope.

The difference between the progression of senile and complicated cataract is that the latter after its incipiency

under the posterior capsule, involves the balance of the lens substance in a manner described as a creeping forward, irrespective of anatomic lines.

Most beautiful are the remnants of the embryonic vessels on the posterior lens capsule. If properly focused they may be seen in every human eye. Also in conjunction with this it is noted that the attachment of the hyaloid artery is not in the lens center but somewhat nasal and downward, corresponding anatomically in that respect to the displacement of the entrance of the optic nerve on the back of the eyeball.

In the vitreous we see a definite supporting structure. Exudative deposits and blood remnants are suspended in this and on movement of the eyeball the whole mass is set into motion. After the eyeball has come to rest, they, however, are seen to return to their definite original location.

By using the contact glass of Koeppe over the eyeball, I have been able to see the fundus stereomicroscopically under a magnification of about 40 times. The crossing of the retinal vessels one above the other is beautifully seen in the perspective. In cases of retinitis pigmentosa Koeppe has ascertained that the pigment may wander into the vitreous.

By these new methods of clinical observation I am sure many new facts will be disclosed. Of its importance to ophthalmology, this very superficial outline will have given abundant evidence. I will be glad of the opportunity to cooperate with any of my colleagues in the study of suitable cases.

CONTRIBUTION TO THE STUDY OF ONCHOCERCOSIS.

R. PACHECO-LUNA, M.D.

GUATEMALA, C. A.

Previous papers on this condition are here summarized. The form of filaria causing it is described with its appearances as found in the body and its life history so far as known. The extraocular manifestations of onchocercosis are given, and then the ocular lesions. The latter are divided into more or less distinct clinical forms which are illustrated by diagrams and pictures of lesions and cases. Translated for this Journal by Jean Matteson.

The California State Medical Journal published an article on "Ocular Complications in an Epidemic of Filaria Onchocerca," written by Mr. William Thomas Fee,¹ ex-consul of the United States to Guatemala. Undoubtedly due to the fact that the author is not a doctor, the article contains some inaccuracies and seems rather to have been written for a lay magazine than for doctors of medicine, to whom it is addressed and presented in an important medical journal. We have been interested in various articles,²⁻³ concerning the ocular manifestations which we have been able to observe in those affected with onchocercosis tumors, and are not willing to approve by our silence many of the conceptions which it contains. For this reason we feel compelled to report what has been learned up to the present time upon a subject as interesting as it is new.

By the name of Onchocercosis is understood a new nosological entity, characterized by the formation of a subcutaneous tumor, distinctly limited, containing a filarial *Onchocerca* sp. whose principal symptomatology is shown thru disturbances of the eye.

For some time the colleagues who practice on the Pacific coast, made a decided distinction between the true Erysipelas and "Coast Erysipelas," on account of their having different characteristics. The tumors of the latter were known, but taken for sebaceous cysts of the scalp. Respecting the disturbance of the sight they thought it was occasioned by a very different cause. They considered it one of the calamities of the rich territories; and very often they sent to this city a number of blind people, choosing the most advanced cases. Both Don Domingo Alvarez, our illustrious predecessor in the service of ophthalmology in the General Hospital, and our-

selves had the opportunity to have these patients, but both of us failed to understand the real nature of the infection.

To Dr. don Rodolfo Robles is due the unmistakable merit of having discovered, that the disease known by the name of "Coast Erysipelas" is produced by a filaria which is enclosed in the tumors; and of having discovered the intimate relation which exists between the parasite and the clinical symptoms. Our distinguished colleague honored us by committing to us the study of the ocular manifestations, and in various articles we have tried to explain the results of our investigations.

Onchocercosis exists in an endemic form in an extensive strip of land having an altitude of 2,000 to 4,000 feet, along the coast of the Pacific in the Republic of Guatemala. It is supposed that it passes the frontiers of Mexico and Salvador; unfortunately we are lacking all the data in respect to this, as there has been no case published in those adjacent countries, whose inhabitants as a whole have the same conditions of life and customs as ours.

The parasite is a Filaria of the *Onchocerca* type, its species doubtful. At first they thought they had to do with the known species, *Onchocerca Volvulus*, Leuckart, 1893, (*Castro Villafane*), on account of the microscopic resemblance between the tumors of the two species. We, on account of ocular symptoms, thought at first that it had to do with a different species, as they could not have passed unnoticed by authors who did not mention them in the descriptions which they give in their writings. The brilliant studies which Molina Izquierdo and R. Morales are bringing to a successful end, tend to demonstrate that, in fact, we are dealing with a new species; on account of the important zoologic characteristics

which they have encountered which differ in many points from the already known species.

M. Morales calls the new parasite "Onchocerca" and as the result of his studies he has the firm conviction that the species is entirely new. The different characteristics which figure in the comparison are sufficient to convince one that it has nothing to do with the *Onchocerca Volvulus*, Leuckart, 1893, but is a new

species, and, if to this is added the multiple manifestations produced by the parasite, and not described by any author up to the present time, the conviction is still stronger.

Following we copy the characteristics of the well known species *Onchocerca Volvulus*, Leuckart, 1893, and the characteristics of the new species, *Onchocerca* sp. found by Dr. Morales.

TABLE I.

Onchocerca Volvulus, Leuckart, 1893.

Eggs: Translucent, provided with a prolongation at each end, comparable to an orange enveloped in a paper twisted at the extremities. (Construction in fact, characteristic of the *Onchocerca Volvulus*, Le Dantec).

EMBRYO: Measures 300 microns in length. Has no sheath, tail sharp, a spot on the anterior fifth of the body.

Onchocerca, Species New.

Eggs: Translucent, spherical and oval, of 48 to 56 microns. The embryo sees perfectly in all periods of its evolution.

EMBRYO: Measures 240 to 270 microns in length by 6 in width, has no sheath, tail sharp, clear space in the cephalic region (cephalic lacuna), another at the union of the anterior 40th and two with the central part posteriorly very near to each other. These clear spaces are formed by the interruption of the cellular column, without taking a V form.

MALE: About 23 mm. long, thread-like extremities pointed, cuticle grooved. There are no papillae nor pre- nor post-anus², one anterior spicule, long, thread-like in its free extremity, and the posterior spicule terminates in a mass. The first is copulative, the second accessory. When the copulative spicule is inside of the large intestine it makes with the accessory spicule the form of a V with unequal curved branches and when outside of the large intestine it takes the form of a Y. The curved tail is spiral.

FEMALE: 12, 15 and up to 28 cm. according to the subject. Uterus 440 to 500 microns, from the front, tail curved.

MALE: From 3 to 3½ cm. long and 140 microns wide, thread-like, extremities pointed cuticle grooved, digestive tube straight, and subterminal mouth defenseless, 3 pairs of papillas at each side of the large intestine, 3 pairs of post-anals, 2 unequal spicules projecting outside of the large intestine, tail very curved, generally turned back over itself.

FEMALE: 6 to 7 cm. long and 360 microns wide, tail curved, uterus 700 microns, at the anterior extremity.

Molina Izquierdo⁶ has also the firm conviction that the parasite belongs to a new species. The distinctive characteristics which he found have been published with all their details in the AMERICAN JOURNAL OF OPHTHALMOLOGY in the issue of April, 1919.

The tumors are found most frequently situated in the cellular tissue underneath the scalp (Figs. 4 and 5); and are distinguished by the place they occupy in the head, the consistency which they have and their size and the form, from the sebaceous cysts which are de-

veloped in that region, and with which they were confounded. Their size varies, (Fig. 5). The smallest which it is possible to locate is the size of a grain of rice, the largest reach the dimensions of an almond; and when there are a number joined together they have the volume of a mandarin orange. But ordinarily they are no larger than a bean (*Vicia faba*, L.) to which they bear a great resem-



Fig. 1.—Embryo of onchocerca 48 to 45 μ in diameter.

blance. They are of an elliptical form, presenting two flat surfaces, a form which they take owing to the pressure to which they are subjected, being pressed by flat resisting surfaces. Some-



Fig. 2.—Microfilaria of the onchocerca, 240 to 270 μ long and 14 μ broad.

times they are found in other parts of the body, and take the globular form when they are not pressed against a bony surface.

The dissection of these tumors presents no difficulties, because they are perfectly defined, and do not adhere to the neighboring tissues. Frequently they lie upon an excavated surface in the bony plate of the cranium and the meninges palpitating in the back gives the same impression as if they had been made purposely with a trephine crown.

The tumor, properly speaking, is composed of a bell-like formation in an inextricable net of one or of various filarias in a vascular conjunction of new formation. In this tissue cavities abound, in which are found embryos, when male and female exist united in the same tumor.



Fig. 3.—Head of onchocerca.

It does not happen when there are found only single examples of the one sex. This makes us believe that the filarias are developed, live and die in the same tumor. It is impossible to dissect the tumors with needles because the result is that the filarias stretch, are deformed and end by breaking. The only way complete specimens are obtained is by digesting the tumor in artificial gastric juice. Care must be taken to regulate and maintain it at the temperature of the human body.



Fig. 4.—Tail of onchocerca. Male 23 mm. long.

Using this method, Molina Izquierdo succeeded in obtaining the first entire filaria, the most beautiful male example which we had seen.

The carrier which serves for the contagion has not been discovered, notwithstanding that Drs. R. Robles, R. Morales and Calderon have occupied themselves with the study. We suspect that like all other filarias better known, there must exist a provisional host for the species, which occupies our attention, in whose organism the embryo undergoes a phase

of its evolution, until the larva is in condition to penetrate the subject, in order to arrive at the adult stage. In the Draconulosis are small crustacea the cicoples in which part of the evolution is effected, and man is infected by drinking the water which contains them. They penetrate the organism thru the mouth, are carried to the stomach where the juices digest the crustacea, and the

lord. Sex does not count. We have seen children at the breast, of four months, that presented the complete clinical syndrome. Interesting observations, from the view of social class, are of a boy of ten years, the only son of a German proprietor of a beautiful property. Another of the administrator of an important agricultural property in the zone of Yepocapa, which is published in full in our first communication.² In his work Fee considers 80,000 the number of infected in Guatemala. We think it premature to present exact statistics, but we believe this will prove greatly exaggerated.

The larvae which penetrate the human organism seem to be somewhat retarded in their transformation into adult filarias, and to provoke eye troubles. We have come to this conclusion from a circumstance which we have been able to study of a young man, who for the first time passed a vacation of a month in the infected zone. He consulted us the day following his return, and we were able to locate a tumor and recognize disturbances on the part of the eye.

The investigators have not been able to find the embryos in the circulation. With this object in view, Dr. Robles examined the blood several times in 24 hours and the result was always negative. They have tried to establish the formula for leucocytosis of these patients. The result has been a marked eosinophilia, 60%. This is of importance, as it is only 40% in patients who are carriers of intestinal parasites, which are in the majority.

Up to the present time we have not been able to make an autopsy, as there have been no deaths among our patients. But if we are to be guided by what is known of other filarias, we must believe that the same thing takes place in "Onchocercosis." The tumors are developed and grow only in the cellular tissues, under the skin, in the location pointed out by us. In fact, the filarias best known, show a marked predilection for the superficial parts of the body, and consequently inhabit the subcutaneous cellular tissue, which may be owing to the fact that they need to be near the surrounding atmosphere in order to assure the conservation of the species.

It is evident that the filarias live very



Fig. 5.—*Onchocerca* sp. Tumors life size.

freed larva emigrate to the subcutaneous cellular tissue. In Filariasis various species of mosquitoes serve as carriers. The kind which sting the man when he is asleep and inoculate the larvae below the skin, which larvae reach the lymphatic glands where they soon reach the adult state.

In Onchocercosis, we repeat, the transmitting agent is still unknown, but although the embryos have not been found in the blood, there are reasons for believing that the inoculation is made by the bite of certain blood-sucking insects. It is not possible to think that it may be from the water, on account of the clean demarcation of the infected zone, a zone which is crossed by rivers which rise and empty in territories outside of these limits and which remain invariably safe. To confirm this statement we know estates in which the disease is unknown, nevertheless all their water is received from the infected district.

In the infected zones the majority of the inhabitants are infected. The rich and poor alike, the laborer and the land-

far from the organ of vision; but this is the "organ which we have constantly found affected, in the hundreds of patients which we have examined in this regard. Consequently we can only believe that the parasites exercise their action at a distance, by means of a substance which they secrete and which is carried by the circulation to the whole organism. This substance has, among others, the property of producing, sometimes, perfectly appreciable lesions of the eye, and at other times, disturbances which we cannot recognize as yet, with the means of investigation at our disposal at the present time, but which lessen considerably the sight of those affected by this clinical condition. Such a process is not rare in parasitology. To go no further, no one doubts today that it is the secretions of parasites which produce the symptoms, at a distance, in "uncinariasis." The same process governs the general disturbances made by the larger number of other intestinal worms.

The disturbances which the secretions of the *Filaria onchocerca* sp. develop at a distance, are shown in the human organism by two classes of symptoms. Some are inconstant and affect different parts of the body in the form of eruptions, which have some of the characteristics of the erysipelas produced by the streptococcus, for which reason it is generally called by the name of "Coast Erysipelas." Other symptoms are constant and appear in all patients. We consider them characteristic of "Onchocercosis," and that they affect in different ways the organ of vision. To such an extent does this intimate relation between tumors and ocular manifestations exist, that when we find ocular symptoms, just as surely there are tumors; and vice versa, if tumors first call our attention, on examination, we find the sight affected.

The description of manifestations as varied as they are different, is no easy matter if they are not simplified as much as possible. For this reason, we shall divide the manifestations of "Onchocercosis" into two large classes: Extraocular manifestations and ocular manifestations. We will begin with the first, and everything which we note below is a faithful relation of what

we have been able to observe during our stay in the infested zones, and what we have found in many patients who are constantly coming from a distance to consult us, either to our service in the General Hospital, or to our private clinic.

EXTRAOCULAR MANIFESTATIONS.

What we shall call extraocular symptoms of "Onchocercosis" are principally



Fig. 6.—Extraocular form. Child suffering the so-called "Coast erysipelas."

manifestations of the skin of the face; which show themselves in the form of eruptions more or less acute, and have in many ways a certain resemblance to the erysipelas produced by the streptococcus, for which reason it has been called generally, as we have already said, "Coast Erysipelas."

Its resemblance to the true erysipelas is very marked, as to the short time in which it develops into an acute eruption. (Fig. 6.) In three days the face is swollen, the skin is tight, puffed up by a hard infiltration which eradicates the natural folds and the wrinkles of age, and is very different from edema, as the pressure of the finger leaves no impression. The eyelids, lips and ears partake of the infiltration; and being double their usual thickness, acquire the appearance which they have in erysipelatous infiltration of the face. But this condition differs from it, in that no change in the color of the skin is observed, nor local differ-

ences of temperature exist. The subjective sensations, which those attacked experience, are only photophobia, a sensation of a drawing of the skin of the face, as tho this distended skin was about to burst open; and local irritations and itchings.

When the acute eruption is passed (it sometimes reappears at irregular intervals), the manifestations become less; and this new state is what is called the chronic form. In reality it only differs from the acute by the diminishing of the symptoms; and by an olive or bronzed color, which the affected parts take on, and which seems to be peculiar to the disease. There is also observed in the height of the period of subsidence, a very fine scaling off of the skin, such as takes place in pyrexia; which gives the patient the appearance of having powdered the face.

The extraocular symptoms appear most frequently in the subjects whose infection is recent. They sometimes precede ocular symptoms, but they generally develop at the same time. They do not correspond particularly to any definite ocular form. In the course of an ocular form, erysipelas manifestations may be entirely lacking. In some they make their appearance for a short time, and in others for a long period.

It is absolutely unknown what the relation is which undoubtedly governs the appearing of the symptoms in the form of eruptions. We suppose, however, that they must have some relation to the life of the parasite. It is beyond all discussion that all the patients who present the complete symptoms of "Coast Erysipelas" have filarial tumors in some part of the body.

OCULAR MANIFESTATIONS.

Everything that we shall note below in regard to ocular symptoms, which is the principal object of this study, we take from our own observations, and in order to explain them as clearly as possible we shall group them in clinical forms, which appear, at first sight, to have to do only with the tissue of the eye which is more or less affected. But after examining a large number of patients, it has been observed that between one form and an-

other there exists a certain real relation to ocular lesions; degrees more or less advanced of a slow and progressive course which, in the majority of those attacked, leads one to believe that it has a certain relation to the age of the infection.

In order to make a complete description of the ocular symptoms of Onchocercosis, we set forth the following scheme:

Keratitis Punctata Superficialis :

Horizontal (Fig. 7.)

Marginal (Fig. 8.)

Inferior (Fig. 9.)

Iritis Fibrinosa :

Without disturbance of the pupil (Fig. 7.)

With disturbance of the pupil (Fig. 9.)

Amblyopia, without other appreciable symptoms.

But it must not be thought that we are speaking of pure forms, nor that only one tissue of the eye is affected. For example, when we say a person has the form of "Iritis Fibrinosa" without disturbance of the pupil, we do not mean the patient has the cornea entirely healthy, because this does not frequently happen. What it means is, that the part of the eye most affected is the iris,—that the symptoms on the part of the iris are those which predominate over the rest of the existing manifestations.

CLINICAL FORMS.

SUPERFICIAL HORIZONTAL PUNCTATE KERATITIS. This manifestation of Onchocercosis seems to be the one which presents itself most frequently, and seems also to be an early manifestation; it is observed, therefore, in the beginning of the disease and in young subjects. It sometimes accompanies the extraocular symptoms, but can develop perfectly without these symptoms appearing, or after they have disappeared.

The onchocercosis patient thus affected, begins by experiencing subjective sensations, as of a foreign object in the eye, dryness of the conjunctiva and pains around the orbit. These discomforts are accompanied by an intense photophobia (Fig. 10). The patient cannot endure the slightest brightness, for which reasons he

shuns the light, protecting himself by covering his eyes with his hands, or turning his back to the light, and only experiences relief in absolute darkness. In this condition, it is wholly impossible to make any examination of the eye; it is a useless undertaking to try to treat the eye with the orbicularis thus contracted to its maximum.

Not until the photophobia has somewhat subsided is it practicable to make a clinical examination, and it is then that

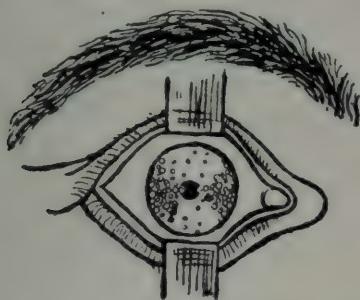


Fig. 7.—Superficial punctate keratitis. Horizontal form.

the patient begins to realize that he sees poorly. He sees objects surrounded by a dense mist, he only distinguishes masses.

The objective examination shows ciliary injection, which is very slight, exceedingly fine, and would pass unnoticed if not sought for. The membrane of Bowman is found to be infiltrated by very minute dots of a whitish color (Fig. 7), which do not stand out on the surface; and so slight that they would not be noticed if the cornea were not examined by oblique illumination, or the subject were not enlarged with a lens. The arrangement which this dotting takes is entirely characteristic of this form. It is observed that the lesions arrange themselves in the horizontal diameter of the cornea, precisely in the part which the eyelids leave uncovered when the eye is open. The grouping together of the lesions is denser near the edge, where it reaches its maximum; and diminishes progressively as it approaches the center of the cornea, where the elements are few in number and there are spaces entirely free from them. The centers are transparent. The pupil is contracted, free,

but slow to act to the light and with atropin. The back part of the eye is normal.

We note that the arrangement in the direction of the horizontal diameter of this Superficial Keratitis Punctata is entirely its own, and characteristic of Onchocercosis. We know of no other affection of the cornea in which the elements, which constitute it, invariably keep this arrangement.

The course is rapid, and in a short time reaches the state of complete development. We have the observation of a male child of five months, which presented the complete clinical form. The mother said that the disease had made its appearance one month before. The lesions described have a chronic course, last for years. They diminish in time, but the dotted elements do not disappear entirely. Consequently, in all the cases in which the cornea has been affected, there remain indelible infiltrations which lessen the visual acuteness. Photophobia, which is the most troublesome symptom for the patients, disappears completely; and there seems to be no tendency to relapse.

MARGINAL SUPERFICIAL PUNCTATE KERATITIS. We have also described this form under the name "Microcornea."³ A short time ago we differentiated it from the other ocular manifestations. It presents itself somewhat frequently and has no acute period in its evolution. It develops independently from the extra-ocular symptoms.

Onchocercosal patients who have microcornea as the principal symptom or the only one, are not troubled with their sight. By this, we mean that their sight is normally acute, or very little changed. On account of its slow and insidious course, having no acute inflammatory symptoms which make them suffer, they do not consult a doctor. It is necessary to hunt them up; and, to a certain extent, compel them to be treated. These patients give the impression of having Microphthalmia (Fig. 8), which, however, is only in appearance, because the ocular globe is, in reality, of normal size.

It is the diameters of the transparent cornea which are found to be diminished; on an average they are reduced to 8 or 9

mm. The reduction in size is due to a process of marginal keratitis very different from the superficial horizontal keratitis punctata, which we have just described. In the marginal form, the elements are also superficial infiltrations, in the form of a slight dotting of Bowman's membrane, which are spread over the whole circumference of the border of the cornea. The grouping is so compact at this level, that it forms a uniform opaqueness of a whitish color, in the

the cornea, the infiltration becomes less, the elements become more scarce, until some are completely isolated. In the patients whom we have examined, the lesions do not advance to the center of the cornea. We have not found them in the part of the membrane thru which the luminous rays, which penetrate the eye, normally pass, and for this reason the visual acuteness is not diminished in this form.

The course is progressive and slow; but it appears to have a limit which it does not pass, since, as before stated, in

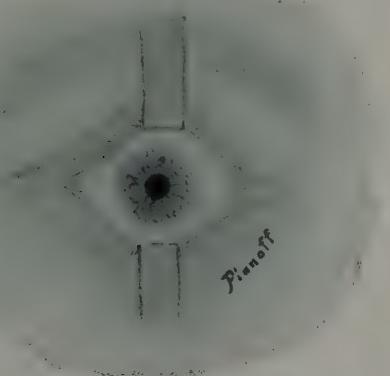


Fig. 8.—Marginal superficial punctate keratitis.

form of a circle or ring, which has the same color as the scleral coat of the eyeball; so similar that it is confounded with it, all the more as there exists no appreciable line of demarcation between the two membranes. This concentric invasion of the cornea, which at some points reaches even as much as two mm., is what reduces the diameters and gives to the eye this special appearance.

If we compare the examination made in the dark room by oblique illumination with that of simple inspection without enlargement, it will be noticed that the opaqueness is superficial; and that it is situated in Bowman's membrane, from the level of which it does not stand out in relief. It is made up of slight dotted elements, disposed in groups so compact and uniform on the border of the external coat of the cornea, that it appears to be a continuation of the scleral coat of the eyeball, in the form of a thick and perfectly opaque membrane. But as it progresses in the direction of the center of

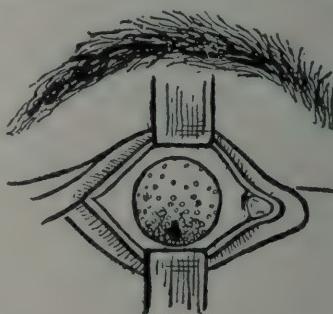


Fig. 9.—Late stage of chronic inferior superficial punctate keratitis with fibrinous iritis. Infiltrations chiefly in lower part of cornea. Pupil drawn down almost to lower limbus, an irregular vertical oval.

none of the cases presented to us have the lesions invaded the central part of the cornea, and consequently the vision has not suffered. We consider it therefore, the mildest form of Onchocercosis.

INFERIOR SUPERFICIAL PUNCTATE KERATITIS (Fig. 9). This form is very characteristic of Onchocercosis. The keratictic infiltration is composed of superficial dotted elements, in every way similar to those described in the previous clinic forms, but they are very differently arranged. It has also, as a distinctive characteristic, that of not appearing alone. It accompanies the form Iritis Fibrinosa, with disturbance of the pupil and seems inseparable from it. For this reason we shall discuss it more in detail further on, describing together these two forms which belong wholly to Onchocercosis.

FIBRINOUS IRRITIS, WITHOUT DISTURBANCE OF THE PUPIL. This form is noticed in those onchocercosis patients whose infection is of long standing. It

is therefore slow in developing and insidious in establishing itself; and is generally found in those who have shown no extraocular symptoms. It is rarely seen pure, and generally appears to be a continuation of superficial punctate keratitis. Whether pure or mixed, the visual acuteness is very much affected.

The form is characterized by photophobia of moderate intensity. Persons thus affected are able to continue their occupations for a long time, to a certain extent. This they do best by protecting themselves from strong light,—drawing the brim of the hat down over their eyes, or using glasses of a suitable color. Besides, lacrimation and injection of the eyelids, persons thus affected cannot look at an object without tears immediately filling the eye, which, at the same time, becomes red and injected.

In a pure case, a very fine injection of the eyelid is noticed, which has the characteristic of only being very clear in the part of the eyeball which the opening of the eyelid leaves uncovered when the eye is used. The corneal centers are permeable to the light. The iris is smooth, as if stretched. The pupil pointed in form, irregular, free, but does not react either to the light or to convergence. Atropin dilates it very little; which is very curious, as at the beginning of the disease and for some time after, there exist no adhesions which impede it. In cases of long standing, things change. The pupil, thus reduced and resting on the anterior face of the crystalline lens, does not react, being fixed in that position. Patients who reach this final stage are blind, they can scarcely distinguish day from night, and need some one to lead them.

Before the synechiae are established, the lesions undergo a marked regression when the organism is freed from tumors; but the operation has no effect when the disease has reached a more advanced stage. In such advanced cases, in which there are extensive synechias and the sight is almost gone, Dr. Domingo Alvarez practiced very extensive operations on the iris; which were successful as to the operation, but without functional result. We had the opportunity of making a careful examination of several of these

patients, who show wide openings cut in the iris. But notwithstanding that the pupils were perfectly permeable to the light and the fundus apparently sound, they did not experience the least change in visual acuteness. Such facts tend to demonstrate that there must exist changes in the deep membranes, or in the optic nerve, which do not show themselves; or which we are not able to appreciate with the aid of methods of examination at our disposal.

FIBRINOUS KERATITIS, WITH DISTURBANCE OF THE PUPIL. We wish now to call your attention to an ocular form, perfectly characteristic of Onchocercosis. We believe it belongs to this disease, as we do not know of this clinical picture having been presented before in ophthalmology. It is one of the latest manifestations; is seen in persons of 40 years of age and upward, and its frequency increases with age. So that it tends to make us believe that it is the last stage of Onchocercosis, and that it takes a good many years for it to reach this form which we are considering.

We suppose that it begins with the characteristics of Iritis Fibrinosa, without disturbance of the pupil, and that it is a continuation of it. We suppose, with some foundation for our belief, that it has to do with the same process. The exudation is deposited between the iris and the lower part of the crystalline lens, a position which it takes from its own weight, when the person is in a vertical position, which is the usual one; and that when it organizes the fibrin suffers retraction and carries the pupil downward with it.

This form is produced by changes in the iris and cornea. It is the result of the simultaneous development of a fibrous condition of the iris and a slow, superficial, punctate inflammation of the cornea. Both processes, thus combined, correspond to a clinical form belonging perfectly to, and very characteristic of Onchocercosis.

The pupil, pointed in form, adhering and immovable, is outside of the situation it normally occupies (Fig. 9). We notice that it has suffered a downward deviation. It occupies a new position, near the lower edge of the iris. It approaches

so near to this limit that it finally reaches it. The iris, due to its great elasticity, resists this pulling and is drawn tight, forming the back of the anterior chamber. It assumes a smooth aspect, as if it were wasting away. On studying a large number of patients, one discovers pupils situated at different points of the space they must pass over before they reach the limit of abnormal displacement. They accomplish this passage without the least manifestation of an acute stage.

In the lower limit of the cornea, near the edge, is noticed, as the pupil approaches this limit of displacement, the simultaneous development of a superficial opacity. By a careful examination, it has been proved that this infiltration is composed of very fine elements, pointed in form, situated superficially in the membrane of Bowman; which, on account of the arrangement they maintain, being more abundant near the edge, appear to be an infiltration which invades the cornea from the circumference toward the center, but which diminishes and disappears entirely after having penetrated it only a short distance.

In certain patients, in which the displacement was complete, and the development of the infiltration of the cornea was thick, it was utterly impossible to record the condition of the pupil. It seems going too far for us to state that in these cases we had to do with blind or incurable persons. Incisions of the iris, which were performed, did not give them their sight. Undoubtedly this lack of improvement was due to inappreciable changes in the deep membranes of the eye or the optic nerve. These are developed simultaneously, as happens in the form which we described above.

AMBYLOPIA, WITHOUT APPRECIABLE SYMPTOMS. We put in this group onchocercosis patients who only suffer gradual diminution of visual acuteness, without experiencing any other phenomenon than the gradual loss of sight, so that during the whole course of its development not the least change in the ocular globe is noticed, even on minute examination.

We suspected, at first, that there were lesions in the back of the eye. In order to find out what these were, we performed repeated ophthalmoscopic examinations,

and the result was always negative. We found no change to which we could attribute, even remotely, the diminution of the sight.

It is generally a disease affecting adults around 40 and over, and they are all carriers of onchocercosis tumors. They have noticed that for some time they did not see well, and that they continually see less, without experiencing anything else abnormal. After a good many years of this gradual loss of sight, they arrive at such a stage that they are unable to walk alone, in broad daylight; and are seen with head high in the air, eyelids very wide open, the eyes moving constantly without fixing objects, etc., etc.

The lack of ophthalmoscopic symptoms in this form of Onchocercosis proves clearly the following interesting observation: A lady in our best society was obliged to consult an optician, because she noticed that on certain days she saw very poorly. This optician, thru ignorance, had the mania of sending to the United States those patients whom he could not fit with suitable glasses. In consequence, the lady made a voyage to New Orleans, where she consulted a noted oculist who exhausted every means of investigation in the eight consecutive days that the examination lasted; and finally, he explained that it was an error of refraction, and ordered the use of graduated glasses. As the lady experienced no relief, she went to New York and in that great city put herself in the hands of the best known oculist, who, in his turn, gave the opinion that there existed no lesion in the back of the eye, and limited himself to giving her a formula for spectacles.

Both of these distinguished oculists made an ophthalmoscopic examination and both declared that there was not the least lesion of the deep membranes, nor of the optic nerve. On her return she consulted us. We found only a progressive diminution of visual acuteness, which was not due to any appreciable lesion of the apparatus of sight; and a small tumor of the size of a bean, which did not bother her in the least, and which had been growing for a long time, near the end of the left eyebrow. The extirpation of the tumor had for immediate

result an increase of visual acuteness, which has continued up to the present date.

In the form which we are considering, the visual acuteness increases considerably, immediately after all the tumors are removed. We have several observations which prove this; one, especially, illustrates the point. A patient from the infested zone arrives, led by a guide,—the examination is negative. Visual acuteness; he is only able to distinguish day from night. That same day, the tumors,

Patulul, having a great number of onchocercal tumors in the head, and a typical interstitial inflammation of the cornea. The general examination, which we make of every patient, showed us the existence of an exostosis of the right tibia and Hutchinson teeth; which was sufficient for us to require a visit of the father, who told us the mother was syphilitic.

Without advising previous treatment, we removed the tumors. The result of the operation was: the rapid disappear-



Fig. 10.—Filarial tumor of scalp indicated by cross. Extreme photophobia shown by contraction of brow and partial closure of lids.

which were on his head, were removed; and the following day he arrives for treatment already seeing perfectly, and to prove it, he points out the sea, 30 miles away.

There are not lacking those who would attribute much more to Onchocercosis. Without denying anything, we limit ourselves to what has been described. Until a larger number of observations have proved other things, we do not care to venture into the unknown. Possibly, many forms which some doctors like to multiply indefinitely, are isolated cases, which need ample and very minute study, in order to exclude other pathologic factors which can modify greatly.

A single example will illustrate better what I wish to maintain. It is the case of a boy of 11 years, who came from



Fig. 11.—The same patient as Fig. 10, after removal of tumor, showing by relaxation of face his relief from photophobia.

ance of the photophobia and excessive secretion of tears; but the infiltration of the cornea was not modified in the least. After waiting three weeks, we commenced a treatment of mercury and iodid; which resulted in a perceptible modification of the exostosis and the complete absorption of the interstitial infiltration of the cornea. Similar cases must exist, and for this reason all ocular manifestations must not be considered as dependent upon Onchocercosis, because of the fact that they coincide with it, in that there are onchocercosis tumors present in the organism.

On one point, however, we must insist once more, and that is: the fact that all ocular forms which we have described, pure or combined, we have observed in a great number of patients who had in their

bodies onchocercosis tumors, acquired in the infected zone; and that these forms have characteristic features which perfectly differentiate them from similar manifestations of different etiology.

The course of the ocular forms which we have described, is chronic and progressive. They take years to develop; they usually attack the anterior segment of the eye: the cornea and the iris; and the changes which they pass thru are apparent. The cornea is generally first to be attacked, and later, the iris; but as a matter of fact there are cases in which the order is reversed.

Likewise, in the clinic one runs across pure manifestations, in which we find only one of these membranes affected. In the forms of superficial punctate keratitis, in the beginning of fibrinous iritis without deviation of the pupil, and in amblyopia without appreciable lesions, the patients experience a great improvement, and a considerable increase in visual acuteness, immediately after the tumors are removed (Figs. 10 and 11). This does not happen in the advanced forms of fibrinous keratitis with and without displacement of the pupil, but this is owing to the fact that the synechias and displacement which the pupil undergoes are so constituted and undergo changes so great, that they are not modified. But these cases do cease to progress. The keratitis punctata seems to have a limit which it does not pass, and the arrangement of the lesions is confined to a certain order which is characteristic of the form which it represents.

The diagnosis is clinical. The laboratory aids very little, because in daily practice it is not a question of establishing the species to which the parasite belongs, which is a matter of long investigation. The clinic alone is sufficient to prove the presence of tumors, which are characteristic of the ocular and extra-ocular disturbances which we have described. When it is the ocular and extra-ocular manifestations which arrest the attention, we believe that they are in themselves sufficiently characteristic and different from other pathologic entities. So that one thinks immediately of Onchocercosis; and the presence of tumors serves to confirm the diagnosis, leaving

no room for doubt. But it is not always possible to locate the tumors, and in this case the clinical description is, of itself, sufficiently typical, so that the disease would not be taken for an infection of a different nature.

Under these conditions we have followed carefully, for two years, a case of horizontal superficial punctate keratitis, of the purest type; which has not been benefitted in the least by many treatments, local and general, to which we have subjected it during this long period, because we have not been able to find the tumors which everything leads us to believe exist; and the cause remaining, the disturbances continue the same.

Embryos have not been found in the blood, altho investigations have been made, repeating the examinations several times in the 24 hours. The leucocytæmia is of importance, because it has been established that the 60% eosinophiles represent a rather exaggerated eosinophilia, which would be difficult to find in any other parasitic disease.

In case there is the slightest doubt about the nature of the tumors, the cutting of one of them would show the presence of the parasite; which is seen rolled up like a ball of the size and color of a white thread. Squeezing one of the sections between the fingers, a liquid oozes out; which, on microscopic examination, shows innumerable embryos.

We believe Onchocercosis to be a disease of grave prognosis, as it affects the visual function. Because, if not treated properly, the sight is gravely impaired, and a late treatment is not always effective, as the disturbances are not modified,—the lesions have reached a stage from which they cannot go back.

In the presence of the ocular forms which we have described as produced by Onchocercosis, every treatment fails, which does not remove all the tumors which exist in the organism of the patient. We have tried, without success, all the usual remedies, making use of the various channels: stomachal, subcutaneous, intravenous, conjunctival, subconjunctival, and injecting into the tumor itself. The removal of the tumor, on the contrary, gives immediate and surprising

results; for incurable disturbances, it at least checks the progressive course of the lesions. We insist upon the fact that favorable results are wanting when all the tumors are not removed, which happens when they are very small and pass unnoticed.

The removal of the tumors is an operation of minor surgery, which is accomplished with a local anesthetic. The operation is very simple and presents no difficulties whatever, as the tumors are perfectly limited, and consequently isolated from the neighboring tissues, with which they have no adhesions which might be necessary to consider. As they are almost always found in the head, under the skin of the hair, our advice is, when there are several tumors, to make various incisions, one for each tumor; and not a large incision which takes them all in, as such an extensive wound bleeds too much and it is difficult to sew up so many blood vessels, which must necessarily be cut. And if the anesthesia is not good and the operation is too prolonged, the patient becomes restless and suffers,—all of which is spared by following this little

precept of technic, the result of our own experience.

In the present state of our knowledge, it is not yet possible to formulate exact rules of prevention, because the agent is unknown which plays the important role of intermediary host. If our suspicions are taken into consideration, that the contagion takes place thru the intermediary of the taones or glosinas, which, as we know very well are blood-sucking insects which bite people during the daytime, live on the banks of streams, like the shady forests and shun exposed places, we would advise, as an efficacious preventive means, the following; which, from the point of view of the general conditions in the infected zone, are perfectly practicable.

1. The treatment by operation, of all persons having Onchocercosis.
2. The building of dwelling houses as far as possible from the banks of streams, in open places.
3. The introduction into dwelling houses, of potable water for domestic use.
4. The clearing of banks of streams which are near land which is cultivated.

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SPASM OF THE RETINAL ARTERIES.

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This paper presents summaries of the most striking cases previously reported, and reports a new one occurring in a girl of 14 years, apparently in good general health. Although the caliber of the vessels was subsequently restored, permanent impairment of the visual field remained. Read before the American Academy of Ophthalmology and Oto-Laryngology, Kansas City, October, 1920.

Obstruction to the arterial circulation is commonly due either to thrombosis or to embolism; that is to the gradual formation or lodgment of pathologic material in the lumen of the vessel. But it is probable that, in any part of the circulatory system in which end arteries occur, the blood supply may be temporarily cut off purely as the result of spasmodic contraction of the muscular fibers in the middle coat of the artery.

The important bearing of our direct observation of the retinal circulation upon a general understanding of vascular physiology and pathology is illustrated by the fact that arterial spasm was first accurately observed and understood when occurring in the fundus of the eye. Osler, discussing the occurrence of transient attacks of aphasia and paralysis in states of high blood pressure and arteriosclerosis, recognizes Peabody's priority in the rational explanation of this class of cases, as being due to the same anomalous contraction of the arterial wall as has been described in relation to the retina. A score or more of cerebral cases experienced by Osler had occurred partly in healthy individuals with high blood pressure but without signs of arterial disease, and partly in well marked or advanced cases of arteriosclerosis.

Two special disease complexes are mentioned by Osler as occasionally presenting symptoms attributable to intermittent closing of the cerebral vessels; namely Raynaud's disease, in a case of which he saw recurring attacks of aphasia, hemiplegia, and loss of consciousness, and angioneurotic edema, a case of which in Osler's experience, in a physician aged twenty-nine years, had developed right hemiplegia and aphasia at the age of nine years, then within a year five or six attacks of transient hemiplegia, and subsequently migraine and the well marked attacks of angioneurotic edema.

Langdon found that cases of spasmodic closure of the retinal arteries could be divided into the following two classes: (1) those in which the first attack occurred at or after middle life, and evidences of renal vascular disease were found; and (2) a few cases beginning in early life, between eight and twenty-five years, without any other symptoms of cardiovascular disease.

Nettleship, who reported two cases, mentions as the common characteristic of cases of arterial spasm the sudden occurrence of loss of vision which continues only a short time (from a few minutes up to one or two hours), affects only one eye, and usually disappears as quickly as it came. But he adds that in some cases a final attack, instead of passing over in the usual way, leads to complete blindness.

Unfortunately, in the majority of cases the arterial change is only visualized through its symptoms and does not present itself to direct observation. The most detailed ophthalmoscopic description of a case so observed is given by Harbridge. The attacks recurred for ten days, one day as often as every forty minutes. The first attack came while bending over, and subsequent attacks followed movements requiring a bending position.

At the beginning of an attack there was gradual diminution in caliber of the inferior temporal artery, and this was rapidly followed by the same change in the other retinal arteries, until they were completely collapsed. Shortly after the arterial change, the veins underwent a similar process. The nerve head became pallid, the retina somewhat hazy. The retinal vessels looked like ribbons against the fundus. This condition continued about four minutes. Then the inferior arteries began to fill, quickly followed by the others; and lastly the blood stream

was reestablished in the veins, the inferior one becoming enormously distended. Sight followed immediately after the filling of the vessels, altho the pupil was still dilated.

The patient, a man aged forty-nine years, had suffered five years previously from attacks of vertigo that had recurred over a year. There was slight sclerosis of the vessels, and there were signs suggestive of beginning tabes. The attacks of temporary blindness finally ceased after thorough purging.

Another patient observed by Harbridge, and who subsequently died of uremia, for five or six years occasionally experienced in the right eye misty vision on unusual exertion. The sight of this eye was then rapidly lost, and frequent study of the fundus after this event showed a peculiar cycle of changes in the retinal blood current. The complete cycle, which lasted about ten minutes, began with an interruption of the blood current in the arteries just after they left the disc. This interruption gradually passed towards the periphery of the fundus while a similar process in the veins passed from the periphery toward the disc. The empty blood vessels appeared as white hollow tubes of normal width. This patient was apparently free from general arteriosclerosis.

Harbridge believes that the phenomena observed in his cases may be accounted for by assuming that primarily they are dependent upon one of the various types of arteriosclerosis. In the first of his cases here mentioned he assumes that a granulomatous nodosity of the intima was intruded into the lumen of the vessel during reflex contraction of the vessel wall. In the other case, which occurred in a person aged only thirty-one years, he postulates a fibrosis of the intima leading to an obliterative endarteritis, the primary cause being some form of infection. A man of fifty-two years who for some time had been under observation by Stöltzing on account of transient obscurations of vision developed such an attack while waiting in the doctor's office. The lower temporal artery appeared as a completely empty white chord, which however at once filled up again. The patient was an alcoholic,

and suffered from mitral stenosis and insufficiency. He subsequently developed in his other eye an embolic process which resulted in a large permanent scotoma.

In a case reported by Lundie, in a man aged eighty-eight years, there was a single attack, lasting less than an hour. The upper division of the retinal artery showed an interruption of the blood column for a distance of less than one disc diameter, as though the artery were being nipped as one nips an India rubber tube. As the attack passed off a fine thread of blood appeared in the portion of the artery previously empty, which soon regained its normal caliber.

Van de Graaf's patient was a woman of thirty-six years who had a hematoma of the frontal region. Shortly before convulsive seizures which were due to the pressure of the hematoma, the retinal arteries became extremely narrow; and shortly after the attacks the vessels were seen to become gradually refilled.

In Jamieson's patient, a man aged eighty-four years, the spasm apparently involved the central artery of the retina, which faded into a mere white line, this being followed closely by fading of the vein and its branches. The optic disc became white and the retina pale. The central artery became visible again in about two minutes time.

Loss of the upper nasal quadrant of the field of vision of the right eye in Hoppe's case occurred following fright during advanced pregnancy. The lower temporal artery on the disc and for a distance of one-fourth of a disc diameter beyond its margin appeared to be absolutely empty. During a period of observation of one and half hours, the blood column was seen at times to retreat from the disc and then return toward it. On the sixth day the previously narrowed portion of the vessel had become of nearly full width, and vision had improved. Hoppe is disposed to explain the disturbance as due to collapse of the vessel wall from temporary lowering of the blood pressure to a point where the pressure could be overcome by the intraocular tension.

A sailor aged thirty-two years whose case was reported by Benson experienced for four years occasional transient

obscurations of vision, sometimes affecting the whole of the field of vision, but most often only one section of the field. The frequency of these attacks increased from one a month or so to as many as two a day. During one of these attacks, Benson found the largest division of the inferior temporal artery of the retina entirely bloodless for about four disc diameters of its length. After a few seconds the interruption of the blood column moved toward the periphery of the fundus, disappearing as it reached the next large bifurcation. In this attack there was total obscuration of the field of vision, and Benson remarks that probably what he saw of it was its final stage only. But on two or three further occasions on which Benson and others were able to observe the fundus during these attacks, the emptying was seen again in the inferior temporal artery. It is interesting to note that on one occasion the patient inhaled the contents of a nitrite of amyl capsule just as he felt the obscuration coming on, but as far as he could judge this produced no effect in lessening the severity of the attack or the time that it lasted. Thoro and repeated examination of the patient by a general physician failed to discover any cardiac, renal, or other disease.

NEW CASE

The case which I had the good fortune to observe differs I believe from any previously reported. It belongs to the less common class in which the patient is young and apparently free from any arteriosclerotic disease. My patient was a vigorous and healthy girl of fourteen years. In the evening of July 5, 1920, she returned by automobile over a long stretch of mountain roads, a considerable part of which were steep, winding and rocky. She had had a large personal experience in driving, but on this occasion sat in the front seat of the car beside the driver. She told me that in such circumstances she thought she did more driving than if she had been actually at the steering wheel. At 10:00 p. m., not long after reaching home, she suddenly noticed loss of vision in the lower half of the right visual field. She thought she had noticed something like the same

condition before, when taking music lessons that she did not like, but these previous attacks were apparently only the usual scotoma scintillans and always stopped when she left the teacher's house to go home. In the present attack there were no wavy lines. She came to my office at 11:40 a. m. on July 6, and stated that the defect in the visual field was no better than when it had begun the night before.

On account of lack of time, I made a rough estimate of the field of vision with my finger as a test object. I found that broadly the lower nasal part of the field was blind, the scotoma being incomplete for a short distance from the fixation point, and absolute over approximately the remainder of the quadrant. Examination of the fundus showed an interruption of the blood current in the principal branch of the upper temporal artery for a distance of about one-third of a disc diameter, beginning a little beyond the margin of the optic disc. The empty part of the vessel appeared as a white band of the same width as the rest of the vessel, and cut off from the normal portions of the artery at an abrupt transverse straight line at either end. (Fig. 1.) I did not observe, and do not believe that there existed, any difference in color between the blood stream beyond the interruption and that of the normal artery.

The patient was seen again three times in the course of the next two days. My history of the subsequent development of the condition is unfortunately not so detailed as could be wished, for the patient was difficult to keep in touch with. She paid relatively little attention to the eye disturbance, did a lot of automobiling with young friends while in town, and after a few days went out of the city, so that I did not see the eye for two weeks. A systematic field chart taken on July 8 was broadly in agreement with the first rough measurement. The interruption in the blood stream showed no change during the three days in which she was under steady observation, and after rather more than two weeks was only partially restored, the vessel at this time appearing as two blood columns of normal width connected by a much narrower red strip. This appearance lasted until

the latter part of July. During August and most of September I saw nothing of the eye. The field was again charted on

test object was seen indistinctly. This indistinct area, and an irregularly oval-shaped complete scotoma which was in-



Fig. 1. Spasm of the retinal arteries. Drawing of the fundus in Crisp's case, showing interruption of blood column in upper temporal artery.

September 22, and its appearance at that time is illustrated. (Fig. 2.). There was a broad area of complete blindness covering about the outer twenty degrees of the normal lower nasal field. Internal to this was an irregular strip covering from fifteen to thirty degrees, in which the

cluded within it on the vertical line at from fifteen to twenty-five degrees below the fixation point, extended over into the lower temporal quadrant for about ten degrees. There was another small absolute scotoma within the indistinct area, along the two hundred and ten degree

meridian, at between twenty-five and thirty degrees from the fixation point. A marked natural restlessness on the part of the patient during any form of examination made exact accuracy in detail difficult.

Central vision of the affected eye has at all times been absolutely normal. The

been advanced is that of a spasmotic contraction of the muscular coat of the vessel. Spasm is presumably due, as in the case of the ciliary muscle and accommodation, to either excessive irritation or excessive irritability or both. In my patient the retina was undoubtedly subjected to an excessive amount of irritation.

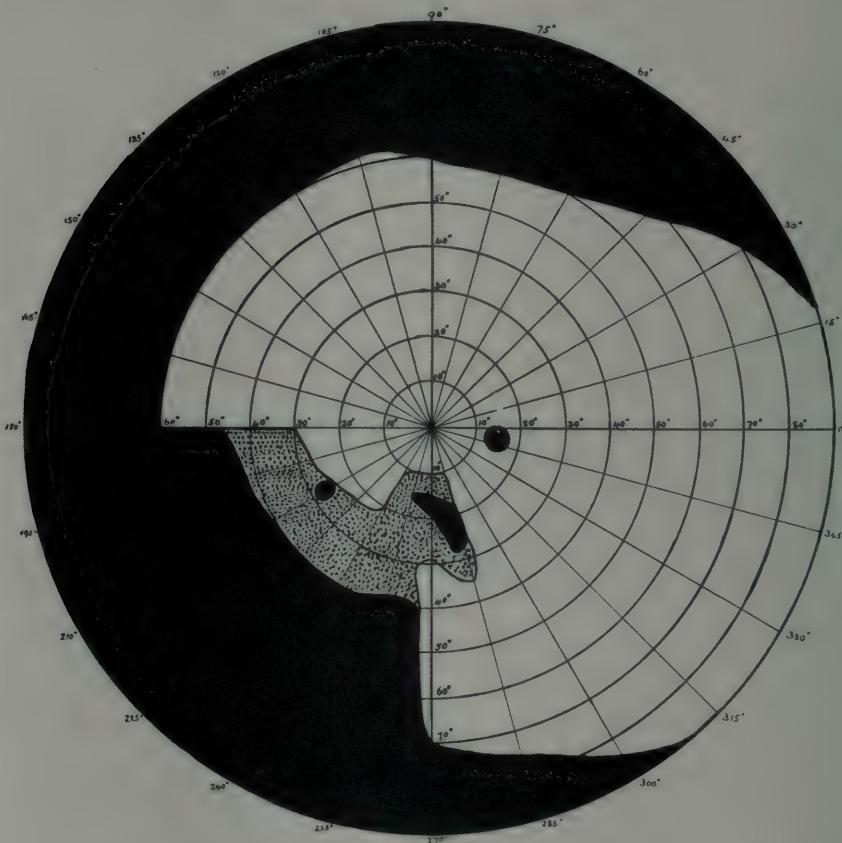


Fig. 2. Spasm of retinal arteries. Visual field in Crisp's case eleven weeks after onset.

patient's blood pressure, taken on several occasions, measured in the neighborhood of one hundred and ten millimeters of mercury. Her family physician, Dr. John Inglis, reported the cardiac and renal condition as entirely normal.

COMMENT: The study of these cases of spasm of the arteries is an extremely interesting one, and, as with a good many other eye conditions, tantalizing in the obscurity of its anatomic foundation. The only plausible explanation which has

Excessive irritability was present in the highstrung nervous system of the patient. In prolonged and intense ocular fixation, especially of rapidly moving objects, the winking reflex is to some extent inhibited, so that the retina is in part deprived of its normal opportunity for rest.

Increased use is followed by increased circulation of the blood in the part. The mechanism of increased blood supply includes on the one hand dilatation of the blood vessels, and on the other hand an

increase in what may be called the peristaltic movement of the vessel walls. Every small bundle of unstriped muscle fibers in the artery no doubt receives its impulse to contraction from a special nerve ending or group of nerve endings. It is conceivable that excessive innervation, a sort of local flooding with nerve force, of a particular stretch of muscle in the middle coat of the artery might result in persistent contraction without the subsequent relaxation which normally should occur. To inquire why that particular stretch of muscle fibers should be selected for overstimulation is perhaps as futile as to wonder why lightning may kill a horse and spare its rider.

Another question to which I can offer no answer is as to why, if the empty strip of bloodvessel which I observed was

caused by a spasm of the muscular coat of the vessel, did the empty part of the artery appear of normal width. Furthermore, if the color of the retinal arteries is due to the viewing of the blood thru a transparent arterial wall, why did the empty bloodvessel appear white instead of transmitting the normal diffuse ruddy tint of the eyeground?

I believe it is fair to suppose that not only this case of arterial spasm but many other accidents to the retinal circulation may be excited by excessive strain upon the retinal and accommodative functions, with the resulting hyperemia and vaso-motor overstimulation; especially when we consider that these excesses are often merely part of a general agitation of the central nervous system.

SIGNIFICANCE OF SYPHILIS AS AN ETIOLOGIC FACTOR IN ACUTE IRRITIS.

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This paper reports in tabular form 100 cases of acute iritis in 80 per cent of which syphilis was found to be the etiologic factor. The methods of diagnosis relied upon were the Wassermann reaction, the presence of condylomata, and the therapeutic test.

On June 10, 1916, there appeared in the Journal of the American Medical Association an article by Irons and Brown, in which they had made a critical survey of 100 cases of acute nontraumatic iritis, forty-seven being private and fifty-three clinic cases. In this series they found syphilis as an etiologic factor present in only 23%. A report on 500 cases from the Wills' Eye Hospital by Jennings and Hill (*OPHTHALMOLOGY*, April, 1909) gave 61.4 as the percentage due to syphilis.

In order to determine in my own mind which of these figures should receive greater credence, I have tabulated the last 87 cases that occurred in our clinic in one group, and in the other 13 cases that occurred in private practice.

Of the first group, 43 had a positive Wassermann, which cleared up under specific treatment, or 49.4%; and 20, or 33.3%, were diagnosed specific clinically, and were relieved by this line of treatment. If the cases in this group were correctly diagnosed, and certainly those showing condylomata of the iris were correct, this makes a percentage of 82.4 in which the spirochetae were the chief etiologic factor. Thirteen, or 15.6%, were negative by the Wassermann test, altho two of these were diagnosed specific from history and therapeutic test, one was doubtful, and one not taken, but diagnosed nonspecific clinically, making a total of 17.1% that seemed nonspecific in origin, most of which came under the head of focal infections, with the teeth as chief offenders. One case was tubercular in origin.

In the group of 13 cases seen in private practice, 9 were certainly specific, or 69%; while one was a diabetic, and the others the result of focal infections, with the teeth again a chief offender. While those met in office work showed a lessened percentage of syphilitic origin, this was

probably due in a large measure to racial difference, but social status was undoubtedly a factor.

In making the diagnosis of a syphilitic iritis there are three very important points to be considered.

- 1st. The Wassermann Reaction.
- 2nd. The Presence of Condylomata.
- 3rd. The Therapeutic Diagnosis.

(1) While some do not consider a case of acute iritis with a positive Wassermann to be always of specific origin, I am of the opposite opinion; and while I can imagine such a condition, it is so rare that the exception proves the rule, and I am very certain that I have never seen a case that did not clear up under antiluetic treatment with the possible exception of a case complicated by tuberculosis.

So that where we have found a positive blood reaction (and usually it is triple positive), we have considered such cases to be luetic.

(2) A condyloma of the iris is, in my opinion, such a positive clinical evidence that I am more inclined to accept it as a positive sign than even a Wassermann reaction. While there is the possibility of mistaking the miliary tubercle for a condyloma, the clinical appearances are dissimilar, and the mistake must necessarily be rare.

(3) Therapeutic Test. This method of diagnosis is the most open to question and yet in certain cases the only method available.

Take a case of acute iritis which, upon careful survey, shows no evidence of focal infection, with negative blood test and negative history, but with increasing pain and redness, and fibrinous exudate into the anterior chamber, and then put upon energetic antiluetic treatment with marked cessation of the symptoms to complete recovery. Certainly this, to my mind, is just as posi-

tive a diagnosis as some of the laboratory tests.

It is true that many cases of acute iritis will be relieved by putting the iris at rest with atropin, and any treatment might be given the credit for the cure. But these cases were intentionally left out of this series as being too questionable for scientific purposes.

Many consider the history in these cases as important as the preceding factors, but I attach very little value to it. In the colored race, a negative history is the rule, even if there has been a very definite infection. Those cases that give a positive history usually give a history of some treatment, but it is possible for them to be cured of the luetic infection

and still have iritis of various origins.

It may be that my friends in other sections of the country, after viewing these figures, will think that the vice crusade has not been especially successful here. It is true that the colored clientele at our clinic is undoubtedly a factor in the high percentage.

CONCLUSIONS: (1) According to this investigation, syphilis is the etiologic factor in about 80% of acute iritis cases.

(2) About two-thirds of the cases are male.

(3) Eight per cent of the cases show condylomata of the iris.

(4) The average age is about 33 years.

HOSPITAL AND DISPENSARY PATIENTS

No.	Initials	Race	Age	Sex	Condition	Blood Wassermann	Remarks
1	R. M.	C	50	M	Acute Iritis.	+++	Secondary eruption and condyloma of iris.
2	I. W.	W	33	M	Acute Iritis.	++	
3	E. A.	C	26	M	Acute Iritis and Keratitis.	+++	Cleared up under treatment.
4	A. J.	C	43	M	Acute Iritis.	+++	
5	S. M.	C	49	M	Acute Iritis.	+++	Cleared up under specific treatment.
6	H. M.	C	24	M	Acute Iritis.	+++	Cured with mercury.
7	W. P.	W	12	M	Acute Iritis and Retinitis.	++	Acquired. Cured with mercury.
8	A. R.	C	23	F	Iritis and Uveitis	+	
9	E. C.	C	27	M	Iritis and Keratitis.	++	Cured with 606.
10	F. C.	C	36	M	Keratoiritis.	+	
11	A. F.	C	36	F	Iritis.	+	
12	J. H.	C	39	M	Keratoiritis.	+++	
13	E. P.	W	31	F	Iritis and Retinitis.	+++	Cleared up under specific treatment.
14	T. G.	W	42	F	Acute Iritis.	+++	
15	B. G.	C	26	F	Iritis and Neuritis	+++	
16	M. L.	C	42	M	Iritis	+++	
17	A. J.	W	17	F	Keratoiritis.	+++	Condyloma of Iris.
18	F. V.	C	24	M	Acute Iritis.	+++	
19	C. R.	C	30	M	Acute Iritis.	+++	
20	B. O.	C	54	F	Acute Iritis.	+++	
21	A. B.	C	55	F	Acute Iritis.	Not Taken	Diag. from condyloma and clearing up under treatment.
22	R. T.	C	27	M	Acute Iritis.	Spoiled.	Had initial lesion 1 year ago.
23	L. F.	C	34	M	Acute Iritis.	Spoiled.	Had initial lesion 1 year ago.
24	H. M.	W	30	M	Acute Iritis.	Neg.	Had initial lesion 2 years ago.
25	E. C.	C	40	M	Keratoiritis.	Neg.	Cleared up under 606.
26	I. G.	C	49	F	Acute Iritis.	Neg.	Cleared up under mercury.
27	H. M.	W	29	F	Acute Iritis.	Not Done.	Had clinical evidences of syphilis.
28	W. H.	C	36	M	Acute Iritis.	+++	
29	S. B.	W	45	M	Acute Iritis.	+++	
30	R. R.	C	40	F	Acute Iritis.	+++	Improved rapidly under mercury.
31	M. G.	C	17	F	Acute Iritis.	+++	
32	E. G.	C	28	M	Acute Iritis.	+++	
33	L. B.	C	43	F	Cyclitis and Iritis.	+++	Condyloma of iris.
34	A. B.	C	53	F	Acute Iritis.	+++	
35	H. M.	C	44	M	Acute Iritis.	+++	
36	L. Z.	W	22	M	Acute Iritis.	+++	
37	M. M.	C	27	F	Acute Iritis.	+++	
38	M. S.	C	38	M	Acute Iritis.	+++	
39	H. B.	C	19	M	Acute Iritis.	Not Taken	Condyloma of iris.
40	E. A.	C	26	M	Acute Iritis.	+++	Genital lesion 3 years ago.
41	S. M.	C	49	F	Acute Iritis.	+++	Cured by antiluetic treatment.
42	C. M.	W	48	.	Acute Iritis.	+++	Primary lesion 15 years ago.
43	E. P.	W	31	F	Acute Iritis.	+++	Papular syphilitide.
44	H. M.	W	30	M	Acute Iritis.	Neg.	Initial lesion 2 years ago. Cured by antiluetic treatment.
45	J. M.	C	43	F	Acute Iritis.	Not Taken	Had condyloma of iris.
46	E. C.	W	51	F	Acute Iritis.	+	Cured by Hg.
47	J. T. ....	.	27	M	Acute Iritis.	+++	Secondary eruption.
48	R. P.	C	27	M	Acute Iritis.	Not Taken	Genital lesion 2 years ago.
49	A. R.	C	23	F	Acute Iritis.	+++	Some keratitis.

50	A. F.	C	36	F	Acute Iritis.	+++	
51	W. P.	W	12	M	Acute Iritis.	+++	Acquired.
52	L. F.	W	34	M	Acute Iritis.	Spoiled.	Genital lesion 1 year ago.
53	J. W.	W	33	M	Acute Iritis.	++	Condyloma.
54	R. M.	C	50	M	Acute Iritis.	+++	
55	A. J.	C	43	M	Acute Iritis.	+++	
56	B. R.	C	28	M	Acute Iritis.	Neg.	Genital lesion 6 years ago.
57	G. P.	CCC	30	F	Acute Iritis.	Not Taken	Diag. clinically as specific.
58	J. H.	CCC	34	M	Acute Iritis.	Not Taken	Gave history of initial lesion.
59	B. F.	CCC	26	M	Keratoiritis.	Not Taken	Diagnosed clinically as specific.
60	J. B.	CCC	28	M	Acute Iritis.	Not Taken	History of initial lesion.
61	P. R.	C	22	M	Acute Iritis.	Not Taken	Cured with mercury and gave history of lesion.
62	A. M.	C	38	M	Acute Iritis.	Not Taken	Diagnosed as specific.
63	T. R.	CCC	26	M	Acute Iritis.	Not Taken	History of initial lesion.
64	R. S.	CCC	22	M	Acute Iritis.	Not Taken	History of initial lesion.
65	M. S.	CCC	23	F	Keratoiritis.	Not Taken	Cured by mercury.
66	M. H.	CCC	14	F	Acute Iritis.	Not Taken	Condyloma of iris.
67	G. S.	CCC	30	M	Acute Iritis.	Not Taken	Diagnosed as specific.
68	R. P.	CCC	21	M	Acute Iritis.	Not Taken	Diagnosed as specific.
69	J. F.	W	48	M	Acute Iritis.	Not Taken	Diagnosed as specific.
70	E. W.	C	24	M	Acute Iritis.	Not Taken	Cured by use of mercury.
71	H. B.	CCC	33	M	Acute Iritis.	Not Taken	Diagnosed as specific.
72	C. A.	CCC	20	M	Acute Iritis.	Not Taken	No definite etiology found.
73	J. W.	CCC	24	M	Acute Iritis.	Neg.	No definite etiology found.
74	M. W.	CCC	30	F	Acute Iritis.	Neg.	No definite etiology found.
75	M. T.	CCC	17	F	Acute Iritis.	Neg.	Improved under mercury.
76	J. K.	W	27	M	Acute Iritis.	Neg.	Diag. of rheumatic iritis (?).
77	G. G.	W	35	M	Acute Iritis.	Neg.	Nondiagnosis as to etiology.
78	O. L.	CCC	27	M	Acute Iritis.	Neg.	
79	M. F.	CCC	26	F	Acute Iritis.	Neg.	
80	E. C.	CCC	45	F	Acute Iritis.	Neg.	
81	H. P.	CCC	?	F	Acute Iritis.	Neg.	
82	G. W.	C	49	M	Acute Iritis.	Neg.	
83	C. J.	W	12	M	Acute Iritis.	Neg.	
84	I. C.	C	26	F	Keratoiritis.	Neg.	
85	F. E.	C	54	M	Acute Iritis.	Doubtful.	
86	J. J.	C	?	F	Acute Iritis.	Not Taken	Had rheumatoid arthritis.
87	R. B.	C	30	M	Acute Iritis.	Not Taken	Diagnosed as specific.

PRIVATE PRACTICE

88	R. D.	W	?	F	Acute Iritis.	Not Done.	Spec. Had mucous patches.
89	L. S.	W	36	M	Acute Iritis.	Not Done.	Diag. rheumatic.
90	M. S.	W	54	F	Acute Iritis.	Not Done.	Diabetic.
91	P. O. D.	W	22	M	Acute Iritis.	Neg.	Diag. focal inf. front tooth.
92	W. P.	W	25	M	Acute Iritis.	Neg.	Spec. Atho negative Wassermann he was put on Hg. and iritis cleared up. All other tests negative.
93	C. N.	W	38	M	Iritis and Neuritis.	+++	Diag. specific.
94	J. M.	W	?	M	Acute Iritis.	Not Done.	Had initial lesion 4 mos. earlier.
95	J. L.	W	59	M	Acute Plastic.	Not Done.	
96	V. G.	C	27	M	Acute Iritis.	+++	
97	M. S.	W	55	M	Acute Iritis.	Neg.	No focal infection found.
98	W. J. T.	W	21	M	Acute Iritis.	+++	Cured with Hg.
99	C. B.	W	53	M	Acute Iritis.	+++	Cleared up under 606.
100	J. F.	W	35	M	Acute Iritis.	+	Treated by 606 and Hg., cured.

DISORDERS OF LACRIMAL DRAINAGE.

H. D. LAMB, M.D.

ST. LOUIS, MO.

This paper gives a general review of these disorders and of the methods of treatment commonly resorted to for them. It was read before the St. Louis Ophthalmic Conference, May 14, 1920; introducing a discussion, which is reported on page 207.

It is interesting to find mention of disorders of lacrimal drainage, with methods of treatment, in the medical writings of antiquity. The Papyrus Ebers, relating to Egyptian ocular therapeutics of 1500 B.C., states that "for the driving away of a swelling on the nose" (undoubtedly dacryocystitis is meant) "use antimony, powdered wood, myrrh and dried honey—rubbing it into the eyes for four days."

Surgical procedures in these cases were practised early, for we find recommendation for excision of the lacrimal sac in cases of fistula made in the writings of Celsus, a Greco-Roman physician of the first century. With a clamp the margin of the opening was seized and the entire abscess cavity was separated and excised down to the bone. The bone was then cauterized with the red-hot iron. Some physicians, Celsus tells us, applied only caustic applications such as copperas or grated verdigris.

Toti can hardly claim priority for the tear-sac operation that bears his name, for Galen writes in the second century that Archigenes in cases of fistula lacrimalis, perforated the nasal bone with a small drill: also Paul in the seventh century says, "After excision of the flesh, use a perforator and make a passage for the fluid or matter to the nose."

Compression of the tear-sac by instruments, the injection of medicinal preparations and the dilatation of the nasal duct by means of sounds were first recommended by the Arabian physicians Rhazes and Avicenna in the 10th and 11th centuries.

Geerig, in his work entitled "Armamentarium Chirurgicum" published in 1838, describes fourteen different instruments, proposed by as many surgeons, for making a passage from the tear-sac thru the lacrimal bone into the nose.

A brief review of some points in the anatomy and physiology of the lacrimal drainage apparatus will I hope not be too tiresome.

The canaliculi are surrounded by a dense network of elastic and muscle fibers; the muscle fibers are arranged circularly about the vertical portion of each canaliculus, but run parallel to the horizontal portion. The openings of the canaliculi into the sac lie behind the middle of the internal palpebral ligament. The lacrimal sac itself contains in its submucosa a large number of elastic fibers.

The tears get into the canaliculi and the tear-sac partly thru capillary action, but largely thru the act of winking. With every contraction of the orbicularis muscle the outer wall of the tear-sac is pulled outwards and forwards, because this wall of the sac is adherent to the internal palpebral ligament and from this ligament originate the fibers of the central or palpebral portion of the orbicularis muscle. The inner wall of the tear-sac being firmly fixed to the bony lacrimal fossa cannot follow the anterior wall as it is pulled forwards and outwards and a lumen is formed, whereas before the sac walls lay in apposition. Into this new formed cavity the tears are sucked thru the action of the vacuum formed. As the orbicularis relaxes the stretched elastic fibers of the tear-sac contract and force the tears into the lacrimal duct, which is wider than the canaliculi. Regurgitation is prevented by the contraction of the muscular and elastic fibers of the latter.

The lacrimal duct has a length of about 15 to 20 mm. and a diameter between bony walls of from 3 to 8 mm. The direction of the lacrimal duct is downward and backwards and most commonly outwards. The deviation backwards is about the same as a line

from the lacrimal sac to the second molar tooth.

The mucous membrane of the lacrimal sac and that of the lacrimal duct form one continuous whole. In both, the epithelium is of two or more layers of cylinder cells; on the inner or highest layer of the duct some observers have made out cilia. The submucous tissue of the lacrimal duct contains a dense plexus of wide veins, analogous to the venous plexuses beneath the mucous membrane of the turbinated bodies. The lumen of the duct in life is reduced to the size of a capillary slit as is that of the sac.

The narrowest part of the duct is at its upper end, where there is commonly left, as a fetal relic, a protruding thickening on the lateral wall of the duct. There is another narrow portion at about the middle of its length; and altho the duct is somewhat expanded where it enters the nose, yet the outlet itself is usually rather constricted. This latter condition is due to a fold of mucous membrane sometimes called the Valve of Hasner, which, extending obliquely from the surrounding margin of the bony orifice of the lacrimal duct, covers over the outlet of the duct, in varying degree.

The walls of the naso-lacrimal duct in the adult are not always smooth and regular, like a more or less uniform cylinder, but at times show folding of the mucous membrane and the formation of diverticula, as established by Tartuferi and confirmed by Hansell. The presence of these irregularities is readily explained by the fact that in the newborn the inner wall of the passage shows many different varieties of protrusions, contractions and other irregularities; whereas, during the period of growth, these usually disappear; at times they may persist to a greater or less degree.

According to Aubaret the anterior ethmoidal cells may extend forwards so as to be in close contact posteriorly, mesially and even anteriorly, with the upper part of the nasal duct.

Whitnall has shown that in 100 skulls examined, approximately the inferior half of the lacrimal sac fossa was

found in every case in relation with the anterior part of the middle nasal fossa, which could easily be entered thru the thin posterior portion of this area formed by the lacrimal bone; also that the superior half of the lacrimal fossa presented relations to an anterior ethmoidal cell.

The pathologic changes of the lacrimal drainage apparatus and their treatment are too familiar to be described in detail.

Drainage of the tears can be disturbed:

1.) By the tears being unable to get into the canaliculi readily.

a.) Very rarely is there present a closure of the entrance of the canaliculi thru congenital atresia, blocking by scar tissue after injury or thru inflammation of the wall of the canaliculus as from trachoma.

b.) A very common change interfering with the entrance of the tears into the canaliculi, especially of the lower one, is eversion of the eyelid.

2.) By blocking within the tear-draining passages.

A.) Within the canaliculi (stenosis or obliteration).

(a) From trachoma and other inflammatory conditions.

(b) From penetrating injuries and caustic burns.

(c) By foreign material, e. g., a cilium, a piece of the beard of barley or wheat; and, rarely by the so-called "concretions," which are yellow, crumbly, actinomycetes like granules composed of compact masses of the fungus streptothrix.

The treatment of all these disorders of the puncta and canaliculi is briefly—slitting the canaliculi.

(B.) Blocking within the tear-sac and within the nasal duct must be considered together since these two structures are essentially parts of one membranous tube.

1.) Obstruction of the Nasal Duct can be caused by:

(a) An acute swelling of the mucous membrane of the duct, or only of the nasal mucous membrane surrounding the outlet of the duct into the nose.

(b) A chronic inflammatory process, or

(c) A cicatricial or at times an ossaceous obstruction.

2.) Causes of strictures and stenoses of the nasal canal:

(a) Congenitally, there is at times a membranous closure of the outlet of the duct.

(b) As acquired conditions, strictures in the nasal duct are usually the result of inflammations developed in the mucous membrane or submucosa of this passage, little erosions, ulcerations or abscesses from nasal catarrh, or from disease of the nasal sinuses.

(c) In both children and adults there may be a tubercular process of the nasal duct or the lacrimal sac.

(d) Syphilis also, in children and adults, may cause inflammation and scar formation in the nasal duct.

EFFECTS OF STRICTURE OR OBLITERATIONS OF THE NASAL DUCT.

In every case of closure of the duct the fluid in the sac is decomposed by the microorganisms present there (particularly pneumococci, more rarely influenza bacilli, Friedlander's pneumobacilli or streptococci), and there occurs usually a mucous or mucopurulent catarrh—a catarrhal dacryocystitis.

When the retention in the sac is long continued its walls expand and we have an ectasia of the tear-sac. Sometimes, thru expansion, the sac-wall becomes inelastic and such an ectasia then remains after the nasal-duct has been made patent again.

If the infected fluid in the sac causes a loss of continuity of the sac epithelium then microorganisms may get into the deeper tissues and lead to a phlegmon of the surrounding structures—a dacryocystitis phlegmonosa. The pus usually breaks thru externally and a fistula of the tear-sac is formed. When such a fistula is lined with epithelium, as soon occurs, spontaneous healing is no longer possible.

Repeated attacks of tear-sac inflammation occurring frequently can lead

to shrinking and even obliteration of the sac.

After the lacrimal sac has become ectatic, the canaliculi as well as the nasal duct often become obliterated and there results a cyst. The contents of such a cystic sac may be entirely sterile.

TREATMENT OF DACRYOCYSTITIS.

Conservative Therapy:

1. Dilatation of the stricture by sounds, sometimes after a preceding incision of the stricture.

2. Formation of a new duct by forcible and repeated sounding.

3. Insertion of a style of lead, silver or gold, or the passing thru of silk thread, horse-hair, silk-worm gut, fine wire or catgut.

Radical or Operative Treatment.

1. Extirpation of the sac.

(a) By incision into the sac and cauterization of its walls by trichloroacetic acid (Gifford's method) or by other corrosive agents.

(b) By excision of the sac.

2. A second form of operative treatment of dacryocystitis is the recently revived dacryocystorhinostomy or formation of an opening from the sac directly into the nose thru the lacrimal bone.

(a) By Toti's method the operator proceeds from the sac into the nose, whereas,

(b) In West's operation he makes a passage from the nose into the sac.

Variations in each of the above forms of treatment have and are being made in the greatest number.

Perhaps the line of treatment for dacryocystitis in greatest favor is: First, a trial of conservative methods—syringing and sounding; followed in the event of failure to cure, by excision of the sac preferably by the Vienna method or Meller's modification.

Probably no other subdivision of ophthalmology is so unsatisfactory in its results and has experienced more modifications of standard therapeutic procedures.

THE DIAGNOSIS OF TRACHOMA GRANULES UPON THE LIMBUS OF THE CORNEA.

KAZUO HIWATARI, M.D.

KAGOSHIMA, JAPAN.

This paper mentions sources of error that might account for the frequency of reports of trachoma granules occurring on the limbus.

In a former report¹ I had an opportunity to explain why trachoma granules, which are nothing but lymph follicles in my opinion, are very seldom found in trachomatous pannus, the trachomatous manifestation upon the cornea, altho they are the essential morphologic feature of trachoma in the fornix and the palpebral conjunctiva.

It seems to me a very curious fact that the trachoma granules, whose very rare occurrence in trachomatous pannus is accepted by every prominent ophthalmologist in our country, are more frequently to be met with in other countries.

Pascheff² from Bulgaria relates, for example, many trachoma cases with granules in the pannus. Recently I was informed personally by MacCalan of Egypt that "the trachoma follicles of the limbus are a frequent manifestation of trachoma in Egypt."

I can not determine immediately the question why such a difference occurs in the different countries.

But I may direct attention here to some points which seem certainly to be overlooked in the diagnosis of the trachoma granules upon the limbus, and might have some relation to the decision of that question.

I. In an inveterate trachoma case the affected conjunctiva gives rise sometimes to severe symblepharon, consequent upon its cicatrical contraction, such as to move the fornix towards the limbus. In such a case the trachoma granules which have been pre-existing in the fornix might come to lie just upon the limbus as if they had developed there primarily.

But they must be strictly distinguished from those which have been primarily developed upon that part, as Prof. Ichikawa has previously pointed out with good reason.

II. During the course of trachoma there occurs the combined infection of the Koch-Weeks' bacilli or the pneumococci; which gives rise, especially in scrofulous individuals, to the eruption of minute granules upon the limbus that look somewhat like trachoma granules.

But they are phlyctenules or resemble infiltration in their nature, and are not true trachoma granules.

III. The correct diagnosis of the trachoma granules upon the limbus or the cornea must depend exclusively upon their microscopic examination; in which their well-known characteristics must be demonstrated.

Above all, however, the following structure should be especially noticed, so far as the trachoma granules are concerned, namely: The marginal portions of the granules, which represent usually a narrow zone, must consist of the small lymphocytes partly emigrating in the epithelial layer; while the wide interior parts, the germ center in my opinion, must consist of large lymphoid cells.

Such a distinct division of the granules into two zones histologically is always missing in the other similar infiltrations above mentioned, altho they might contain a greater quantity of the small lymphocytes.

Another point, which is necessary in the diagnosis of trachoma granules primarily developed upon the limbus, is the seat of the granules.

The subepithelial layer of the limbus, as I have pointed out in my previous paper,³ shows a network of small ledges, resembling papillae in the sections.

Just in that part of the limbus the subepithelial layer is closely adherent, to the subjacent tissue.

The genuine trachoma granules developed primarily upon the limbus must be seated microscopically just in that part or closely in its neighborhood at least.

A text illustration (Fig. 1) copied

from a specimen, taken from a boy, aged fifteen, suffering from the typical trachomatous pannus, with a granule upon the limbus, may demonstrate more clearly what I have above noted.

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Fig. 1.—Trachoma granule in the conjunctiva at the limbus. C B, bulbar conjunctiva; L, ledges; G, trachoma granule.

NOTES, CASES AND INSTRUMENTS

A POSTERIOR SCLEROTOME.

ARTHUR G. BENNETT, M. D.

BUFFALO, N. Y.

The operation of posterior sclerotomy is generally performed with a Graefe cataract knife. The classical method is to make the incision half-way between the insertions of the external and inferior recti muscles, then to twist the knife 90°, so that on withdrawal, a cut at right angles to the original wound will be made.

I beg to present an instrument that



Fig. 1.—Bennett's posterior sclerotome for making an angular opening in the sclera.

will make a triangular wound by one motion more easily than the angular wound is made by the Graefe knife. The objection to the Graefe incision is the twisting of the knife in the wound, which, unless very carefully and skillfully done, is likely to stir up the vitreous unduly, and, if the knife be not properly twisted, fail to make an angular wound which results in too early closure, thus defeating the object aimed at. My instrument, which I call a "posterior sclerotome," is of tapering bayonet shape and hollow ground, which at 10 mm. from the point makes a triangular wound, each side of which is 2 mm. in length.

In its use, all that is necessary is to put traction on the conjunctiva with the forceps used in fixation, in order that when the pull is released, the wound of the sclera and conjunctiva will not coincide. A quick stab to the necessary depth is then made and the conjunctiva released.

The accompanying drawing illustrates the sclerotome and explains the character of the wound it is designed to make.

The G. A. Terry Co., 356 South Elmwood Ave., Buffalo, N. Y., made this

instrument for me, and carried out my suggestions in a very workmanlike manner.

ANOMALOUS SPIRAL LOOPING OF RETINAL ARTERY.

LEE MASTEN FRANCIS, M.D., F.A.C.S.

BUFFALO, N. Y.

The anomaly of the retinal artery illustrated, herewith, occurred in the right eye of a patient, who was referred for refraction. The patient, a

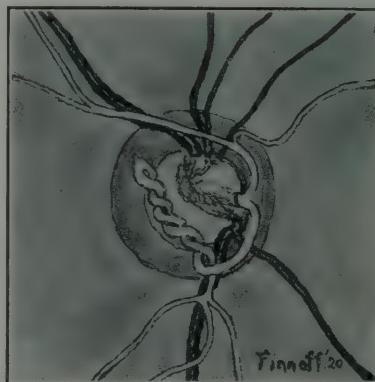


Fig. 2.—An anomalous retinal artery having spiral loop in the vitreous. (Francis' case.)

refractive error and presbyopia. Her blood pressure was reported 110-74, with no heart murmurs or disturbed kidney function. Outside of headaches, her general health is good.

Refraction: O. D. V. = 6/12 + 1.00 Sp. C + 1.25 Cy. Ax. 15 V. 6/5-2, add + 1.00 Sp. V. Jaeger No. 1. O. S. V. = 6/15 + 1.50 Cy. Ax. 180 V. 6/6-2+1, add + 1.00 Sp. V. Jaeger No. 1.

RIGHT EYE: The visual media are clear. The disc margin is clearly outlined with a moderately large centrally placed, physiologic cup. The artery emerges toward the nasal side, branching near the cup brim and crosses one venous branch. Just as it crosses the trunk of the vein, near the disk's edge, the artery is thrown into a loop of five twists, which extends about three millimeters forward into the vitreous. The tip of the loop may be seen with a +10.00. The remaining retinal circulation is normal.

The left eye is normal, showing no vascular or other abnormalities.

The most interesting feature of the case, outside of the vascular anomaly, is the presence of an arterial pulsation, synchronously with that of the radial pulse, strikingly noted at the tip of the vascular loop. No other retinal arteries pulsate nor is there a venous pulse in either eye. A similar case is illustrated on page 2931 in the American Encyclopedia of Ophthalmology, Volume 4, reported by Kipp.

This case was also seen by Dr. W. C. Finnoff, who kindly made the accompanying illustration. (Fig. 2.)

PULSATING EXOPHTHALMOS.

DEWAYNE HALLETT, M.D.

NEW YORK.

Mrs. L. K., 74 years of age, suffering from nephritis, was referred to me by Dr. George W. Whitney, on account of a gradually increasing ptosis of the left upper lid.

First examined at my office April 11, 1918. There was a left ptosis, dilated and inactive pupil, slight proptosis, central retinal atrophy from an old hemorrhage, vitreous opacities, incipient cataract, vision reduced to the ability to count fingers, cornea clear and no pain. The blood pressure was high. The intraocular pressure was increased, and a miotic was prescribed.

About April 28th an acute glaucoma developed, with chemosis, edema of the lids, pupil dilated, no reaction to light, proptosis, no vision, tension of eyeball 68 mm. Hg., with the McLean tonometer. A stronger miotic was prescribed.

May 4th. Developed a hammering and roaring noise in the head, synchronous with the pulse, complete ptosis, tortuous veins in upper eyelid, globe pushed forward and downward, and the inferior conjunctiva a baggy edematous mass prolapsed onto the cheek. Pupil small and intraocular tension within normal limits.

June 4th. With the ear placed over the frontal sinus region, over the eye, or on the left temple, a bruit was very audible. Pulsation visible. Digital pressure over the angular vein at the upper inner portion of the orbital margin caused the bruit to subside objectively and subjectively, and it likewise ceased upon compression of the carotid artery in the neck.

June 10th. The left common carotid was ligated by Dr. Walter G. Crump, during which operation a stethoscope was in position above the eye; and the bruit was observed to nearly cease, only to return in a moment to about one-quarter of its former intensity. After the neck wound was closed and the field about the eye prepared, the angular ophthalmic vein was ligated at the inner margin of the orbit, and this was followed by a complete cessation of the bruit.

About a month later, during which time the patient was comfortable, except for the consequences of nephritis, including marked edema of the extremities, which had been a constant symptom, the bruit gradually developed on the other side of the head, with pulsating exophthalmos. Experimental digital compression of the right carotid caused coma. No further surgery was proposed, and death occurred shortly thereafter, as the patient wished that it might.

AMAUROTIC FAMILY IDIOCY.

J. A. KEARNEY, M.D.

NEW YORK.

R. W., a male child of Jewish parentage, eighteen months old, was admitted to Gouverneur Hospital by the ambulance of the hospital with convulsions Aug. 8th, 1920. Thru the

courtesy of Dr. George H. Hyslop, I was asked to examine him.

The grandparents are all living and well and no history of insanity in either family line could be had by questioning. Consanguinity of parents denied. The patient is the youngest of five children. There were no miscarriages and the other children are in good health. The father of the child is living and well. The mother at about the eighth month of pregnancy with this child had a severe attack of influenza. She died when the child was six months old following a thyroidectomy operation.

The child was said to be normal until three months old when the parents noticed that he could not see, and from this time onward he did not seem to grow as fast as the usual normal child. He never attempted to sit up, nor crawl, nor walk, and was perfectly quiet until six months ago when he developed convulsions that occurred quite frequently.

He was admitted to the hospital with convulsions, and upon examination the temperature registered 103° and he had diarrhea. The temperature returned to normal twelve hours after admission. While under observation at the hospital he lay silent and motionless; but any sudden noise would

induce spasmotic movements of the extremities and at times a slight general convolution. The child died in the hospital Aug. 14th, 1920, six days after admission.

PHYSICAL SIGNS: A large child, well nourished, small head, the lateral diameters greatly exceeding the antero-posterior ones, six teeth, palate normal. Wide costal angle, epiphyses of long bones large, muscles doughy and pit upon pressure, feet held in slight carpal spasm, hands clenched, fingers tapering in type, flexed except the proximal phalanges which were extended, deep reflexes spastic, no Babinski.

EYE EXAMINATION: The palpebral fissures were slightly wider than normal, eyes stare and look straight ahead. He never winked the lids nor moved the eyes from the time of admission. Pupils semidilated, respond sluggishly to light stimuli. Media were clear, optic discs were extremely pale thru out, but showing no neuritic signs, the blood vessels were obviously normal. Greyish white symmetric circular areas were observed in the region of the maculae, eight mm. in diameter with furred edges. In the center of each was a rose-colored spot, one and one-half mm. in diameter. The surrounding retina appeared muddled.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

ST. LOUIS OPHTHALMIC CONFERENCE.

May 14, 1920.

DR. HAYWARD Post, Presiding.

Localization of Foreign Bodies in the Eye.

DR. M. B. TITTERINGTON (by invitation) read a paper on this subject.

DISCUSSION: Dr. John Green: In a number of my patients Dr. Titterington has localized very accurately intraocular foreign bodies. One patient had sustained an injury a year before I saw him. His attendant removed a foreign body from the cornea. Subsequently the eye showed a discoloration of the iris and several dark brown spots on the anterior lens capsule, accompanied by visual failure. Dr. Titterington localized a minute fragment in the ciliary body. It was exceedingly important that the localization should be as accurate as possible as we were probably dealing with a foreign body that was encapsulated and it was necessary that the small magnet be introduced as close as possible to the foreign body. Thru a very small incision at the indicated site the tip of a small hand magnet was introduced and on the second attempt a very small particle was removed. The patient did well tho eventually a traumatic cataract developed, which was extracted. Patient has fair vision, 20/120, which probably could be improved by division of the membrane. I advised against it because of the fact that the other eye was perfectly good.

Another patient in whom a foreign body was disclosed by the doubly sensitized film, was interesting also in that a competent roentgenologist had made a plate some two years before and found no evidence of a foreign body. In this particular case the question arose as to whether any operative interference was justified.

Recent experience has seemed to show that our former views as to the removal of an eye in which there is a

foreign body may have to be modified. In the presence of an intraocular foreign body most ophthalmologists will insist that the foreign body be removed, or if this is not possible, that the eye be enucleated. On the other hand, a number of men, especially those who have had overseas experience, are inclined to think that such an eye may be retained. This view is doubtless due to the very small number of cases of sympathetic ophthalmia seen during the World War.

My patient had had a combined extraction performed by another surgeon; the iris was muddy brown and tremulous and there was floating material in the vitreous. Vision p. 1.; field defective. I told the patient there were three courses open; first, that no operation be performed in view of the fact that the eye was painless and unirritated, and that there was no irritation of the other eye; second, that an attempt to remove the foreign body might be successful, but, on the other hand, might lead to the loss of the eyeball; third, that the globe be removed. After explaining the *pros* and *cons*, the patient decided to leave well enough alone. I am rather inclined to think he adopted the most rational course.

Dr. W. H. Luedde: A lateral view, to determine the presence of a foreign body, may prove disappointing; in a recent case the shadow of the fragment of steel was completely masked by the shadow caused by unequal density of the cranial bones and it required an antero-posterior view to discover the foreign body. It appears to be unsafe in any case to be satisfied with a roentgenogram taken in only one direction.

This same case illustrated another difficulty. A localization was made by Dr. Titterington with the result that the horizontal and vertical projections on the chart did not agree as to whether the fragment was just inside or outside of the sclera. The diagrams were based on the average size of the eyeball and a variation of a millimeter in actual size may

thus lead to confusion and error. In this case, the fragment had entered thru the cornea and lens, the clouding of the media making it impossible to get a view of the fundus with the ophthalmoscope. On exposure to a giant magnet, there was a strong "pulling" sensation so that the globe was opened in an attempt to deliver the fragment. In spite of the introduction of a metal tip deeply into the vitreous, no fragment presented itself. The operative wound healed perfectly and the slight inflammatory reaction indicated that the fragment was, after all, lying in the orbital tissues having probably passed entirely thru the globe.

Perhaps a procedure noted in the special report of Dr. M. F. Terrien on "The Use of Radium and X-Rays in Ophthalmology" (1919), might be of some help. He suggested a study of the change of position of the shadow produced by rotation of the eyeball. It is quite likely that this fragment was so close to the sclera that it would have moved with the ocular movement even tho truly extraocular.

In another case X-ray localization was practically out of the question, due to the large number of fragments. A tray loaded with detonating caps exploded while the workman was carrying it. His face, body, and lower limbs contained many fragments. Both eyes were perforated at several points, but the intraocular fragments seemed to be causing no trouble. Conservative treatment resulted in an unexpected degree of vision in each eye in spite of opacities in both lens and cornea due to penetrating wounds and the retention of tiny fragments.

This brings up the question of the retention of fragments in the eye. Several years ago a man was brought to me who had sustained a severe ocular injury, the result of an explosion in a coal mine. The eye seemed hopelessly lost. There were several fragments clearly visible on the iris. Nevertheless, the eye quieted and was retained. No general rule can apply to all cases. Each must be judged after close observation. According to recent experiences, fragments of copper are particularly liable to make trouble.

Dr. Wm. F. Hardy: Cases calling for good judgment are those in which

one is undecided, even with a roentgenogram, whether the foreign body is inside or outside the globe. I have in mind two cases; one Dr. Luedde saw with me ten years ago, in which the X-ray picture had failed to definitely localize the foreign body. On enucleating the eye, my scissors hit something metallic. The foreign body was partly in and partly outside the eyeball.

Another case was one I had at the Barnes Hospital, being that of a boy who had been shot in the eye with B.B. shot. Nothing could be seen in his eye because the lens was cataractous. There was great doubt as to whether the foreign body was located in or outside the eye. I watched him for several months, and finally decided it would be well to remove the eye. The shot was inside the optic nerve and partly in and partly outside the globe. I hit it with my scissors when I enucleated. I feel, therefore, that such cases are those where the best judgment should be used on the part of the ophthalmologist.

Dr. F. E. Woodruff: It seems to me altogether too early to base any opinion on the advisability of leaving a foreign body in the eye, from experience in the war. Accidents frequently happen in uneducated men, who move about from place to place, and we cannot afford to take a chance and let an ignorant man go away from competent medical attention with a foreign body in the eye. These men are very prone to minimize their troubles and after sympathetic inflammation has started it is too late to do anything. One is safe in taking out a foreign body and one is also safe in removing the eye with an imbedded foreign body. To let a man go away from observation with a foreign body in the eye is extremely hazardous, as far as the fellow eye is concerned. When there is a suspicion that a fragment of glass is in the eye, it is often of advantage to take a bit of the glass and place it on the X-ray plate to determine whether the suspected glass will make a shadow, for all glass does not do so.

Dr. John Green: In regard to gunshot wounds, it seems to me that one is pretty safe in retaining the globe. I

have two patients who sustained gunshot wounds, one eleven and one twelve years ago. In one there was a double perforation of the globe and the localization showed the shot two or three millimeters behind the eyeball, probably not in the optic nerve. In the other, it was a question whether there was a double perforation or whether the shot was in the sclera. A double exposure on the same plate, the one made with the eyes rotated down, the other with the eyes rotated up, showed two shot shadows, so it was inferred that the shot was in the sclera. Both of these eyes are blind, but both of them for the most part, have been quiet.

Dr. Wm. F. Hardy: Dr. Green and Dr. Woodruff both brought up points which remind me of a case I saw. A man was struck in the eye with a No. 6 shot, a glancing blow, penetrating the lower lid. He was evidently looking up when the shot entered, as the penetration occurred in the equatorial region. When I saw him the vitreous was so full of blood that no details could be seen at all. He came to me because he had been to another ophthalmologist who had urged immediate removal of the eye. As the eye was never red, no irritation present, no wound of entrance to be seen, except the wound thru lid, and in view of the fact that he had no symptoms whatever, except loss of vision, I decided that I could with safety keep the eye in his head. An X-ray localization was made and it showed a shot in the eye. I feel, with Dr. Green, that in such cases it is not incumbent upon us to urge enucleation.

Dr. Lawrence Post: The practice of the British at the eye base in Rouen was to remove all foreign bodies from the globe, whenever possible. The method employed was to place the patient, suspected of having a foreign body in the globe, before a giant magnet in the hope of drawing the metal fragment into the anterior chamber. If no result was obtained, localization plates were made.

Dr. Titterington: (Closing) Instead of plates, we often use films which have sensitized emulsion on each side.

Employing an intensifying screen, which is covered with a fluorescent salt, as soon as the X-ray light strikes the salt, it fluoresces and it is with this fluorescence that the picture is really made, and not with X-ray light. One of these intensifying screens is put on either side of the film. The exposure is only one-eighth of what it would be with an ordinary plate. If any metallic body is traversed by the X-ray, there is a secondary radiation given off and if the particle is very small and is submitted to the rays long enough, these secondary rays will blot it out. Dr. Luedde spoke of not being able to locate foreign bodies on account of being situated over a bony ridge. I have had that same experience. Now I always make two lateral exposures at different angles. Sometimes both exposures are made on one plate.

Disorders of Lacrimal Drainage.

DR. H. D. LAMB read a paper upon this subject which is published in full, p. 197.

DISCUSSION: Dr. J. W. Charles: While treatment is usually unsuccessful, the older I grow the more I feel that we ought not to give up, because occasionally we do have success. The first patient I had was a boy of nineteen. He had probably a congenital closure of the nasal duct since his history showed a lacrimation from babyhood. I found that he had a slight dacryocystitis, and I could get a probe almost into the nose and there it stopped. After several unsuccessful attempts I entered a No. 8 Bowman as far as it would go, and bore down with all my weight. There was a crash, the patient fainted, but I got thru. On his return home I provided him with a No. 6 Bowman, which I taught him to pass. He went to New Mexico, and wrote me a year after that he did not have any more trouble, and he has not had since. He did not use the probe after the first year.

One can occasionally teach parents to cleanse the sac of a child with dacryocystitis. I have now a child of eight that has been operated on by a rhinologist and oculist without success. In the past she has had occasional lac-

rimal abscesses with fistula. I have taught the father to syringe the sac and he is keeping it thoroly clean; and I believe that the child is getting rid of the infection and later, if the sac no longer discharges pus, I shall, as a final resort, make an endeavor, with the assistance of a rhinologist, to secure drainage by means of one of the newer methods of making a window into the nose.

Dr. Wm. H. Luedde: There is so much to be said about our experiences with dacryocystitis that general discussion may be dulled by too much detail. The importance of these cases was deeply impressed by the experience of a young man who lost an eye from acute panophthalmitis following a penetrating wound. He had a double dacryocystitis apparently due to congenital absence of both lower puncta. The treatment of that case by dacryocystorhinostomy was described by Dr. W. M. C. Bryan and myself in the Annals of Ophthalmology, July, 1912.

Dr. John Green: Eversion of the puncta due to chronic dermatitis in elderly persons is often difficult to manage. I am never able to prognosticate whether slitting the canaliculus or taking out a triangular shaped piece, according to the technic of Dr. Charles, is going to be beneficial or not. Some cases, so treated, drain perfectly. Others, in which there is contact between the slit or excised canaliculus and the globe, have just as much epiphora after as before the operation. I assume, of course, that the lacrimal-nasal canal is patent. I do not believe that invariably an ectasia of the sac remains after reestablishment of drainage. I have two cases in mind in which there was sufficient elasticity remaining in the sac to bring about contraction, after I had done the combined operation of curettage and rapid dilatation. Dr. Lamb spoke of the uselessness of any method short of excision of the sac in trachoma of the sac. I am not sure that that is strictly the right point of view. We know that abrasive methods in trachoma of the lids are very efficacious. It is conceivable that abrasive methods with burs, reamers, and curettes may be effica-

cious in trachomatous inflammation of the sac.

I am one of the believers in the early passage of a small probe in infantile dacryocystitis. It seems to me unwise to continue syringing in these cases for a long period in the hope that eventually patency will be established. That does occur sometimes, but it often involves months and months of treatment. It seems to me that the judicious passage of a small probe, which may be repeated, is the preferred method. This is done under local anesthesia. I have never had to pass the probe more than three times, and I always allow long intervals to elapse between probings. Very frequently, the single passage of No. 2 or No. 3 Bowman (I have never gone above No. 3 Bowman) will restore patency and the trouble is absolutely at an end. I do not slit the canaliculus.

Dr. Wm. F. Hardy: It has always been a mystery to me why excision of the sac has been so little practised in this country when it is so popular in Europe. I have not had many cases in which I have removed the sac, but in those in which I have done it, I have gotten satisfactory results. The one Dr. Post removed in the Clinic was the largest dilated sac I have ever seen. Four months later the patient reported with a perfect result. The operations such as are now in vogue, and which Dr. Lamb showed us are very old; while they do not appear unsurgical, they do seem unnatural to me. I cannot conceive of them curing all or even a large majority of the cases; and where we have chronic, intractable dacryocystitis, it seems to me that there is less trauma and less surgery done in excision of the sac than by any other method. The epiphora, which is the thing to be feared after excision, does not materialize, except in a small proportion of cases; and certainly the chance of regurgitation of purulent material into the conjunctival sac is absolutely obviated, which more than compensates for the inconvenience of an epiphora, often transitory.

Dr. Lawrence Post: I agree entirely with Dr. Hardy. When I have had very long drawn out cases, which re-

fused to get well with the usual methods of probing and irrigation, I have usually resorted to excision of the sac. The results have been so good that I have never felt the need of any other procedure. Epiphora has seldom lasted longer than six weeks.

DR. LAWRENCE POST read a paper entitled: "A Study of the Etiology of Periodic Ophthalmia in Horses." To be published in full in this journal.

JOHN GREEN,
Secretary.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

Dec. 6, 1920.

DR. E. B. HECKEL, President.

Enlargement of Pituitary Body.

DR. EDWARD STIEREN presented a forty year old man, a printer by occupation, whose right eye had gradually become blind in the past six months. In addition he complained of a deep seated pain in the right temporal and frontal regions, some loss of memory and loss of sexual power.

When first seen Oct. 11, 1920, the pupils were normal in size and reaction; tension of each eye was 26 mm. (McLean), R. V. 1/40, L. V. 6/6—, with —1.D.Sph. The corneae, lenses and media were clear. The temporal half of the right optic nerve was pale,

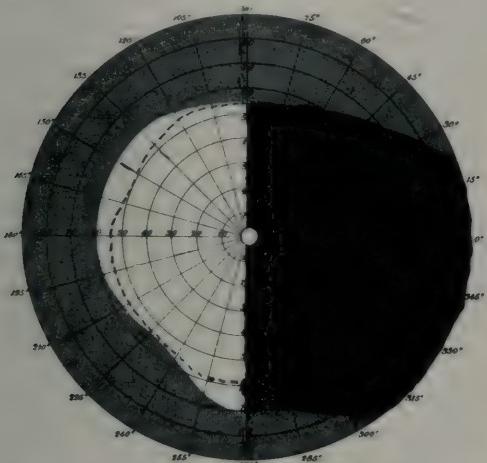


Fig. 1.—Enlargement of pituitary body with complete temporal hemianopsia in the right eye. Chart of field taken October 11, 1920, with 10 mm. object.

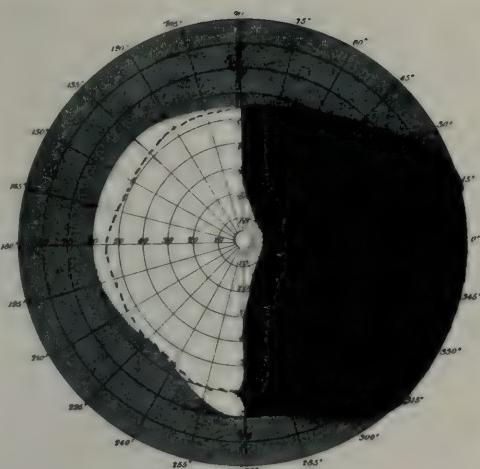


Fig. 2.—Enlargement of pituitary body. Extension of field of the right eye almost 10 degrees beyond the fixation point. Chart taken November 24, 1920, with 2 mm. object.

and there was a narrow pigmented crescent at the temporal edge of the disc. The left nerve head was normal. No nystagmus. Perimetric examination disclosed a complete temporal hemianopsia in the right eye; the field of the left was normal for form and colors. (See Fig. 1).

Neurologic examination by Dr. W. H. Mayer: Arm, abdominal, cremasteric and patellar reflexes are present and normal. There is no Babinski. No evidence of any cranial nerve palsy nor any muscular twitching or tremor. His physical development is good with a rather undue prominence of features, a definite thickness of his fingers with a tendency toward the trident hand. He is short and heavy set, and has the straight lumbar spine so often noted in endocrine conditions. The thickness of the bone shafts appear unusually heavy both to palpation and X-ray examination while the epiphyses are normal. There is a ring of fatty distribution in the abdomen above the umbilicus (Marie's sign). The gonads are well developed and show no abnormality. X-ray of the head shows a definite thinning of the floor of the sella, the anterior and posterior clinoid processes are indefinite and appear eroded.

Laboratory examination: Blood and spinal Wassermann negative; urine negative; blood count, Hb. 95%,

R.B.C. 5,000,000, W.B.C. 8,000, Polys. 49%, Mono. 26.5%. The blood sugar is within the normal point. The sugar tolerance test shows the patient to be able to ingest 500 grams of glucose without functional glycosuria.

From the above, a diagnosis of enlargement of the pituitary was made. Following the observation of Timme that a hypertrophy of the pituitary occurs in a pluriglandular syndrome, and that the characteristic disturbances are due to an inability of the normal pituitary to combat antagonistic secretions elsewhere in the chromaffin and interrenal systems, it was decided to administer pituitary gland substance.

This was given as a test in the hope of relieving the overtaxed pituitary and ultimately permitting it to recede to a more normal size. Whole pituitary gland, eight grains every 24 hours, was begun Oct. 21 and continued without interruption until the present time, a few days over a period of six weeks.

As a result there has been noted a gradual but undoubted improvement in several respects. The field of vision in the right eye has advanced almost ten degrees from the fixation point on the nasal side, slightly less above and below. (See Fig. 2). The headaches have been entirely relieved and both the patient and his wife note an improvement in his mental and physical condition.

Ammonia Burns of the Cornea.

DR. E. E. WIBLE reported as follows: A gang of eight men were operating a "skull-cracker" which is an immense iron ball, elevated to the top of a derrick and allowed to fall upon scrap metal of various kinds. This reduces it to fragments suitable for use in the manufacture of open hearth steel. A full ammonia cylinder, supposedly empty, had been "scrapped" and when crushed by the "skull-cracker" liberated the ammonia in concentrated form, enveloping the entire gang. The men had their sleeves rolled up and shirts opened and sustained burns of all the exposed tissues, including the corneas.

Four of the men sustained but slight burns of the first degree, and left the hospital later the same day. They complained of a slight burning in the

throat and eyes. The treatment consisted of a single instillation of a 4% sol. of cocaine, irrigation with boric acid and instillations of OI. Ricini every four hours.

CASE 5. In addition to the general burns of second degree, suffered a severe chemical burn of the palpebral and bulbar conjunctivae and of the portion of the cornea corresponding to the palpebral fissure. This patient was discharged from the hospital in 10 days, not entirely recovered but with corneas perfectly clear.

CASE 6. Sustained 2nd and 3rd degree burns of the exposed portions of his body and a severe burn of both corneas which quickly became steamy. He died rather unexpectedly on the fourth day.

CASE 7. Sustained a severe burn of both corneas which first became hazy, then "steamed" and later developed a china whiteness with consequent loss of vision. When patient died on the tenth day, the corneas had not yet begun to slough.

Cases five, six and seven received the following treatment:

4% sol. cocaine (one instillation), irrigation with a warm boric acid every 4 hours, two drops of a 1% sol. atropin sulphat, t.i.d., one drop of OI. Ricini hourly, and cold compresses to reduce swelling, reaction and pain.

CASE 8 sustained first and second degree burns of the skin surfaces and a severe burn of the corneas.

There was a deep sloughing of the right cornea three weeks after injury. This was about 4 mm. in diameter. It was so deep that perforation was imminent, covered the pupillary area, and was very slow in healing.

Fourteen days after injury there were three small areas of sloughing in the left cornea. The healing was very slow and was not completed until four weeks later.

The scarring was quite marked, altho dionin and hot compresses were employed in the attempt to limit the extent and density of the cicatrices. He was discharged from the hospital on the 120th day.

DISCUSSION.—Dr. E. B. Heckel: I am not in favor of the employment of

cocain in these cases. Holocain in my opinion would be preferable, altho I do not employ either in this type of case. We begin the use of continuous hot compresses immediately, thereby diminishing local pain, assisting nature in maintaining the vitality of the parts and hastening the healing proc-

instructor at a large institution in this city.

Sixteen years ago, while in 9th grade, grammer school, the vision began to fail in both eyes. She was attended at that time by Drs. Burroughs, Park Lewis and E. E. Blaauw of Buffalo. Dr. Burroughs made several mus-



Fig. 3.—Van Kirk's modification of the Peter Campimeter front view.

ess. We employ sterile olive oil in these cases instead of castor oil, instilled every two hours.

Dr. Stanley Smith: We saw many cases of this type during the war and learned to be very conservative in our prognosis, as many cases in which the burn at first seemed very slight, developed later extensive and deep sloughing, owing to the penetrating character of the caustic.

Bilateral Conical Cornea.

DR. STANLEY SMITH reported the case of Miss M. E., age 29, well developed and in excellent general health, who for some time has been physical

cle adjustments, possibly with a hope of diminishing pressure.

The case came under my observation in February, 1920, at which time there was a small corneal ulcer O. S. This healed quite promptly. The visual acuity at present is, O.D. 6/60, O.S. 6/20 eccentric; the deformity of the corneas is quite marked. She is now using a weak sol. of eserin salicylat as a possible aid to drainage.

DISCUSSION.—The various surgical procedures, sometimes employed in these cases, cauterization of the tip of the cone, resection of a portion of the cornea, etc., were discussed.

However the general opinion was essentially conservative and in favor of the continued employment of miotics.

A Modified Campimeter.

DR. V. E. VAN KIRK presented a new campimeter, a modification of the Peter instrument, describing it as follows:

A ring of steel wire is mounted in a handle and face piece, so made that the center of the ring is $6\frac{1}{2}$ inches from the patient's eye. The ring is covered with white muslin, upon which the design of the Peter instrument is drawn. Over this is sewed a layer of black velvet; a small white button is secured to the center of the velvet.

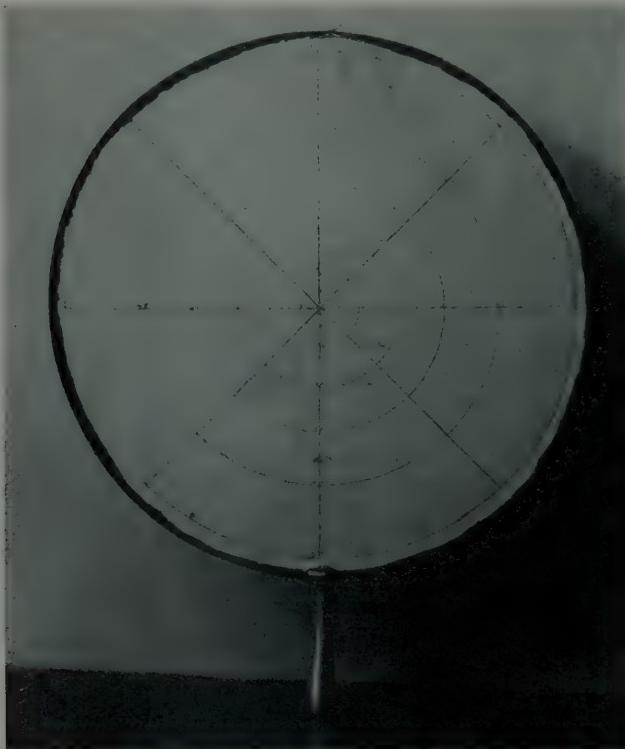


Fig. 4.—Van Kirk's modification of the Peter Campimeter rear view.

In the use of the Peter campimeter the following defects were found:

1. The board was not an even dull black.
2. The fixation point was not prominent enough.
3. The design on the face of the board distracted the patient's attention.
4. In repeated examinations the design on the face of the board aided the patient's memory.

This model was then designed to overcome the defects and to retain the great advantages of the original Peter instrument.

This gives an even black background with only the point of fixation and the test objects showing. A very slight pressure of the test object shows its position on the design on the back of the screen.

HUNTER H. TURNER.

COLORADO OPHTHALMOLOGI-CAL SOCIETY.

November 20, 1920

DR. G. L. STRADER presiding.
Disciform Keratitis.

W. C. BANE, Denver, presented a woman aged twenty-seven years whose left

eye had become inflamed about the middle of October, 1920, altho there was no pain until the first of November. For five days and nights before consulting Dr. Bane on November 9, there was very severe pain in the eye and left frontal region. On this date the vision of the left eye was 5/20. There were moderate circumcorneal congestion, slight discoloration of the iris and a disc-shaped haze in the substance of the cornea about 4 mm. in diameter, its center being about 1 mm. below and outward from the center of the cornea. There was no loss of corneal epithelium. The pupil dilated readily under atropin. The tension was about 40 mm. of mercury. The treatment consisted of calomel and aspirin internally, and heat and two per cent dionin solution locally. On November 13 the tension was 43 mm. Under eserin and one per cent guaiacol the tension on November 16 was 24 mm., the vision of the affected eye 5/60 plus.

DISCUSSION. G. F. Libby, Denver, remarked that the case differed from typical disciform keratitis in the absence of dense central infiltration.

Edward Jackson, Denver, said that it also differed from other cases which he had seen in its rather acute onset. He had seen two cases of disciform keratitis that were clearly syphilitic and yielded to antisyphilitic treatment. Weeks had reported a case with histologic examination.

G. L. Strader, Cheyenne, Wyoming, had presented a case of disciform keratitis to the society eight or ten years ago. It started with an injury from a cinder at the center of the cornea. After treatment for six months, an ulcer of almost pin point size appeared at the center of the disturbance. This yielded to the application of fuming nitric acid on a sharpened match, and within two or three weeks after this the case was entirely well so far as the inflammation was concerned. An opacity was left but the vision was fairly good.

Chorioretinitis Juxtapapillaris.

W. C. BANE, Denver, presented a boy aged sixteen years who had come on October 9, 1920, complaining that on the previous day he had noticed that the vision of the right eye became suddenly

very much blurred. There was very little discomfort. At examination the vision of this eye was 5/60, of the left 5/6 plus. There was a marked retinitis extending very slightly beyond the right disc. There was a trace of albumin in the urine. Two weeks after the first examination the swelling of the disc was more marked, the media were somewhat hazy, and there was a gray swelling of about a disc diameter at the macula, with a dark spot in the center. The vision was still 5/60. When the pupil was again dilated on November 8, a ring of deposit was found on the anterior capsule of the lens, and there was an increased haze in front of the macula. On November 15, the macular lesion consisted of an oval blue gray membrane with notched edges, and smaller than the disc. This membrane was to the temporal side of the fovea. The media had become slightly clearer.

DISCUSSION. Edward Jackson, Denver. When by the courtesy of Dr. Bane, I first saw this case the ring of opacities on the anterior capsule made me think of Vossius' ring. But the boy had no history of injury. Altho the ring was not like the usual spots at which the iris begins to pull loose, it must no doubt have been deposited between the two periods of employment of atropin. The case is likely allied to chorioretinitis juxtapapillaris. I should expect some pigmentation at the site of the lesion later. It might be worth while to take the field.

D. H. Coover, Denver, suggested that a Wassermann test should be made.

Iridocyclitis with Hypopyon in Old Injured Eye.

W. C. BANE, Denver, presented a man aged sixty-three years, whose right eye had been injured in 1892 by a glancing blow from a large piece of steel. Cataract had resulted, and there had since been only light perception in that eye. There had never been any further trouble with the injured eye until about the middle of October, 1920, when the patient was referred to Dr. Bane with a diagnosis of iritis and keratitis. There was then marked circumcorneal injection, with 1 mm. of exudate at the lower angle of the anterior chamber. There was an old horizontal opacity 4 mm. in

length below the center of the cornea. The tension of the eye was 33 mm. of mercury. All the patient's teeth had been extracted for more than a year. The vision of the left eye was normal with correction. In spite of the injection of 25 minims of a 1 to 1300 cyanid of mercury solution subconjunctivally together with the instillation of atropin, the pupil had not dilated at all. The patient was sent to the hospital and given aspirin and calomel and salines. On November 18 the exudate in the anterior chamber had diminished to 0.5 mm. in depth. There had been severe pain off and on, and the exudate had since increased to 1.5 mm.

DISCUSSION. A. C. Magruder, Colorado Springs, favored removal of this useless eyeball.

W. H. Crisp, Denver, thought that there might be a calcareous or partial osseous degeneration of the uveal tract.

Retinal Hemorrhage.

A. C. MAGRUDER, Colorado Springs, presented a boy aged sixteen years who had had a series of retinal hemorrhages in both eyes. About the middle of October, while playing football, he fell on his face with a number of boys on top of him, the principal weight being across his waist line. A few minutes later he became dizzy and faint, and things got black before his eyes. After resting for two hours he went home and to bed. A few days later, he discovered that he could not read with his right eye. After a tonsillitis which began on November 1, he began carrying newspapers again on November 8. After carrying the full route on November 13, he went "hooking" (sledding) with another boy, and suddenly noticed the blood flowing over the retina of the right eye. He was a large healthy youth with a negative history except that he had had several attacks of tonsillitis after exposure. Thoro general examination was negative. The blood pressure was 128 mm. of mercury. On November 15, among the traces of former hemorrhages was a band of retinitis proliferans three disc diameters long. The patient's mother had had asthma nine years before coming to Colorado eight years ago.

DISCUSSION. W. C. Finnoff, Denver.

By exclusion tuberculosis is about the only cause we can find in the case. In testing the case for tuberculosis the tuberculin should only be used as a therapeutic, not as a diagnostic measure, because the only reaction to tuberculin we should be likely to get would be the hemorrhages, which we are already having.

Neuroretinitis.

A. C. MAGRUDER, Colorado Springs, presented a man aged sixty years who had come on October 27, 1920, complaining that each morning he had been troubled with waves of light and darkness passing before his eyes, and that he seemed to be looking through a dark veil. There was no pain or redness. The patient was an old tuberculous subject with a history of many pulmonary and nasal hemorrhages. He had also been a rather heavy drinker. In the right eye there was a very extensive old choroiditis. No fundus changes were discovered thru the dilated pupil on November 3, and the vision of the left eye was 20/20. On November 8 the vision of the left eye was reduced to 20/100. There was a definite blurring of the optic disc, there were two white areas above the disc and the veins were large and tortuous. The swelling of the optic disc and the striations of its margins had become gradually more pronounced, and some few white patches had appeared along the retinal veins. The right antrum had been washed out, yielding a quantity of pus, and four infected teeth had been removed. The Wasserman test was negative, as was urinalysis. The ethmoids and sphenoids were also diseased, but the patient refused to have anything further done than the washing out of the antrum.

DISCUSSION. W. C. Bane, Denver: I should insist on having the ethmoids and sphenoids cleaned up or ask the patient to get another doctor.

G. F. Libby, Denver. The case strikes me as one of multiple infection, with the tuberculous influence possibly in the background.

W. H. Crisp, Denver, suggested that in spite of a negative Wassermann test a man who boasted of heavy drinking was likely to have had syphilis.

Edward Jackson, Denver, thought of syphilis as a likely cause in the right eye. The left eye with its marked elevation of the disc suggested the possibility of a vascular lesion in the nerve head. It is at the same time possible that the trouble in both eyes could be explained on the basis of focal infection.

Chronic Simple Glaucoma.

E. T. Boyd, Denver, presented a man aged fifty-three years, who had chronic simple glaucoma in both eyes. Pilocarpin failed to control the tension which ranged from 40 to 60 mm. of mercury. Eserin sulphat controlled the tension of the right eye, in which the field of vision was slightly contracted but the central vision was reduced to 20/200 by a corneal scar. In the left eye, only central vision remained, but this with correction was 20/30. Eserin did not influence the tension of this eye, which on September 23 had been 50 mm. On September 24 cyclodialysis was done, and subsequently no miotic was used in this eye. On September 26, 28, and 30 the tension remained elevated. On October 4 the tension was 20 mm. of mercury, and it had so remained since that time.

Caustic Burn from Water Glass.

E. T. Boyd, Denver, presented a man aged thirty-one years, who on November 16, while sealing boxes with water glass applied upon a brush, had splashed a liberal quantity of the water glass into his left eye. When seen one hour after the accident, the eyelids were slightly swollen, and the man was evidently suffering pain. On opening the eye an immense chemosis was found to involve the lower external quadrant of the bulbar conjunctiva. On depressing the chemotic swelling and evertting the lower lid, some water glass (about the consistency of heavy mucilage) was seen. This was removed with a dropper, the eye flushed with a weak solution of vinegar, atropin sulphat solution instilled, the eye filled with olive oil, and a dressing applied. In the course of the next two or three days there was evidence of tissue destruction, the appearance being that of a chemical burn. At the end of three days the inflammatory condition was much improved, but the

lower conjunctiva was still edematous. Silcat of sodium, the watery solution of which is known as water glass, and is extensively used in sealing pasteboard boxes, coating labels, and preserving eggs, is strongly alkaline and is escharotic to the tissues of the eye. On account of the weight and viscosity of the solution, burns by water glass mainly involve the lower part of the eye. The cornea is not usually involved because the irritant does not remain in contact with it for a sufficient length of time. There is little tendency to the formation of symblepharon.

Traumatic Closure of Canaliculi.

E. T. Boyd, Denver, presented a man aged twenty-two years who on September 6, among other injuries received in a railroad collision, had had a vertical wound, just internal to the inner canthus of the right eye, involving the canaliculi. When the patient was first seen on September 30, there was traumatic epicanthus, the upper and lower canaliculi were closed, and the eye was inflamed and wept continuously. The caruncle was engaged in the scar tissue. One-fourth of an inch internal to the upper punctum was a fistula communicating with the upper canaliculus. It being impossible to pass the smallest probe into the lacrimal sac, Dr. Boyd had slit the lower canaliculus with a canaliculus knife as far as the obstruction, and had then opened into the sac with a Graefe knife and passed probes into the sac. The epiphora had been diminished to the extent that it was only slightly troublesome indoors. At the extremity of the inner canthus the eye did not quite close and the patient got soap into the eye when washing his face.

DISCUSSION. W. C. Finnoff, Denver, had had a somewhat similar case in a little boy in whom the scar obliterated the canaliculi. With considerable difficulty the canaliculus on one side was located and a style and tubes passed through. With the style in place the boy got drainage, but without the style the edges of the wound collapsed. The style had been kept in place for three months. If the case is seen early, and there is an opportunity to pass a style thru the cut canaliculus, it is then best to use horse-

hair rather than silk to suture the cut ends, since the horsehair produces less capillary attraction.

G. F. Libby, Denver, mentioned a recent conversation with Dr. Theobald of Johns Hopkins hospital, in which Dr. Theobald declared that he still used his probes and lead styles, and with just as much success as when he first originated the treatment many years ago.

F. R. Spencer, Boulder, referred to a recent case in which a man who was injured in a runaway had had the lower canaliculus entirely cut in two by a blow from a weed; and in which if it proved impossible to keep the canaliculus open, Dr. Spencer thought it likely that he might have to resort to Gifford's treatment for obliteration of the lacrimal sac.

Dr. Boyd (closing). My idea of the necessary plastic operation would be to slit the upper canaliculus, open into the sac with a Graefe knife, and insert a canula. I believe the most difficult problem is to get the eyelids to close satisfactorily.

Chronic Dacryocystitis.

E. T. Boyd, Denver, presented a woman aged thirty-one years who for several years had suffered from a chronic dacryocystitis on the right side. In June of this year acute suppurative peridacryocystitis had supervened, and the swelling was lanced over the sac. When the patient consulted Dr. Boyd on July 26 there was a large swelling over the sac, with intense redness, and a free discharge of pus ran down beside the nose from a fistula. It was impossible to pass a probe thru either the canaliculus or the fistula. The canaliculus was slit, a small probe passed, the opening rapidly enlarged, and a lacrimal canula inserted. The inflammatory condition cleared up rapidly, within a week the fistula was healed, and in ten days there was no pus. The patient had been wearing a canula now for nearly four months, she was comfortable, and the condition of the stricture was much improved.

DISCUSSION. D. H. Coover, Denver, remarked that we used to get good results with the use of a canula or style, and he did not see why we should not do so now.

Persistent Pupillary Membrane.

E. T. Boyd, Denver, presented a woman aged sixty years who had come for refraction and had normal vision with correction, but in whose right eye had been found a delicate strand like the thread of a cobweb, extending from 2 to 7 o'clock across the pupil. There were some minute beads of pigment on the thread, and contraction of the pupil caused the thread to relax and buckle.

DISCUSSION. G. F. Libby, Denver, two days after Dr. Boyd showed me this case a woman came into my office with almost the identical condition, except in a slightly different location. The case is apparently one of persistent pupillary membrane. These cases are easily overlooked.

W. C. Finnoch, Denver, had found with the loupe that the thread was derived from the stroma of the iris and not from the posterior pigment of the iris. If it were an inflammatory remains it would be connected with the epithelium rather than with the stroma.

Edward Jackson, Denver. It is hard to trace a fine line like this to its origin when it is attached to the anterior surface of the iris. Being so attached, whatever inflammatory condition the eye has been thru, the thread is likely to be congenital and the remains of the embryonic pupillary membrane.

Simulated Choroidal Neoplasm, Possibly Old Hemorrhage.

H. R. STILWILL, Denver, presented a woman aged fifty years, who had first come to him in March, 1920, complaining of the vision of the left eye having failed for the last two years. The right eye had diverged since childhood until about eighteen months previous to the consultation, but at that time the right eye became straight and the left eye turned out. According to her statement, a year or so before the consultation she had stumbled in the dark, striking the left eyebrow, and there had been more or less pain in this eye since then. The vision of the right eye was 4/20 corrected to 20/20. The vision of the left eye was finger movement to the temporal side only. The tension was normal, and the pupil reacted normally. The ophthalmoscope revealed an elevation begin-

ning one disc diameter to the temporal side of the optic disc, circular in shape, and measuring about three or four disc diameters. The mass was elevated about 2 D., the edges coming up rather abruptly from the surrounding retina. It was traversed by slightly tortuous retinal vessels. The surface was glistening white, without pigment, and irregular in places. Toward the lower and inner part of the mass were two or three red spots resembling minute hemorrhages.

DISCUSSION. D. H. Coover, Denver, said that when he first saw the case he thought the mass might be a sarcoma, but it had shown no development since then and he had given up the idea.

Edward Jackson, Denver. The rather irregular outline is a little against its being a new growth. The history of injury is very clear, and also the statement that the sight of this eye was affected at the time of injury, and especially valuable is the patient's statement that the right eye always turned out until the left eye was injured. I think it must be one of the cases of chorioretinitis proliferans of which many cases were recorded during the late war; commencing with hemorrhage, and finishing with a mass of organized connective tissue.

Extraction of Dislocated Lens.

J. M. SHIELDS, Denver, presented a man aged thirty-three years whose right eye had been struck by a rivet on October 14, 1920. Seen an hour later, there were two extensive abrasions of the cornea, the anterior chamber was deep and filled with blood, there was a radial tear of the iris below, and the lens was dislocated backward. The lens was partly opaque and was supported above by the suspensory ligament. On November 27, Dr. Melville Black attempted extraction thru a section including the upper half of the cornea. The vitreous presented alongside the knife before the section was completed. The lens was removed with a wire loop, the vitreous flowing freely during this performance. No attempt was made to excise the vitreous, but the eye was closed, and the patient kept in bed and as quiet as possible for eight days, during which he made no complaint of pain in the eye. The first dressing, on the eighth day, showed the eye to be almost entirely white and free from photophobia, the corneal flap in position, and the pupil black.

W. H. CRISP,
Secretary.

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ASTHENOPIA.

This word was defined by Mackenzie as "that state of vision in which the eyes are unable to sustain continued exercise upon near objects," without other evidence of disease. Many cases were removed from this class by Donders' observations regarding hyperopia astigmatism and presbyopia. It may now be held to include only those unable to use their eyes for more than a very brief time without pain, altho the eyes are without recognizable ocular conditions to account for this disability. Sufferers from asthenopia in this sense are always something of a puzzle to their medical advisors. There is a tendency to doubt if the suffering so much complained of can be wholly real, and not more or less exaggerated.

It must be borne in mind that we have no common unit for suffering; no objective method of measuring it, except by the evident effects it produces on the sufferer. That different persons suffer very differently, from exactly the same injury or lesion, must be admitted by every observing physician. The same person differs enormously in

sensibility to pain, in different physical conditions. A college professor known to his friends as a nervous man, with little stoic endurance of discomfort, when living his routine working life, became a different individuality during his summer vacation. After a few weeks cruising on a sail boat, he suffered a carbuncle involving most of one side of his face. He opened it freely himself, with the knife he carried; and said this was no worse than skinning his knuckles when at home. The extensive facial scars resulting became as much a matter of pride as those of a German college duellist.

We must judge of suffering by the testimony of the sufferer. Altho one is sometimes tempted to indulge in skepticism about it, this is the only evidence we can get on the subject; and to form any rational judgment we must consider such evidence. Judged by such evidence, asthenopia is a morbid condition worthy of our best efforts to relieve. The fixed idea that all such complaints are "hysterical" and must be ignored, is irrational and quite fatal to the usefulness of the physician.

Among the forms of asthenopia that get scant attention and little sympathy, at least in temperate climates and among city dwellers, is that of pain produced in apparently normal eyes by exposure to bright light; altho every one admits that this is to be expected in eyes that are suffering from certain ocular inflammations. We recall a sufferer from such asthenopia in the medical corps of the navy, who for years had been regarded with suspicion by his superiors, and given scant consideration because his eyes exhibited no objective lesions; and he was suspected of simply trying to avoid duty at sea and in the tropics.

Under the name "tropical asthenopia" this disability is given the consideration it deserves by Col. Elliot in his recent book, "Tropical Medicine," noticed elsewhere in this number of the JOURNAL. He brings together the following instance in support of the reality and seriousness of the affliction. "A young English planter in the East travelled many miles to consult a surgeon. A 'careful examination' of his fundus was made, and he was assured that there was 'nothing the matter with his eyes.' Some idea of the despair into which the loss of his last hope plunged him, may be gathered from the fact that he returned to his estate and drowned himself. The medical man, whose 'careful examination' had probably increased his patient's suffering, was disposed to consider the patient's symptoms unreal, until he heard of the melancholy ending of the case. It was only then that he realized that possibly he had made a mistake—an opinion in which there was little difficulty in confirming him.

"A gentleman who had served a long time in India complained that, in his worst attack, which, by the way, was cured by leave to Europe, he was so bad that, when he was on his journey home, the 'sight of a white face was enough to pain him.'

"A medical man who suffered from glare, stated that on one occasion when he went home much run down in health, it was painful for him to write on white paper.

"An elderly gentleman in the Civil Service only began to experience any trouble in the last four years of an exceptionally busy and active official life in India; his servant had orders to enter his room before daylight, to close every door and window, as otherwise the light was apt to upset him for the day.

"An ophthalmic surgeon in large practice suffered so severely from his eyes that he had to devote Sundays to lying in a darkened room, in order to rest himself sufficiently for the work of the coming week. He was only able to carry on by the determination 'to stick it' at all costs.

"A missionary who had landed in India full of enthusiasm, was seen in a condition bordering on insanity; he said that life was one long misery; even in the dark room the least ray of light annoyed him. An Ichabod had been written across his once ardent missionary zeal, and his one desire was to obtain a medical certificate that would enable him to escape from 'this hateful glare.'

The importance of asthenopia has frequently been forced upon the writer by the extreme cases that occur among patients suffering from pulmonary tuberculosis, involving lesions of considerable extent, but generally with rather good systemic resistance. Such patients sometimes have marked errors of refraction and sometimes very slight ones, but no evidence of ocular disease. In either case they complain of very slight inaccuracy in their correcting glasses, and appreciate some diminution of suffering from slight rectification of their lenses. But they never get anything like complete relief from their pain and disability, and under the best possible conditions cannot use their eyes anything like as much as they wish. With recovery from the tuberculosis, they become free from asthenopia, and may discard glasses on which they were before entirely dependent.

All who make a practice of carefully correcting errors of refraction find a certain number of patients whose suffering is not relieved by lenses. Atten-

tion to muscular imbalance relieves some others, but some remain who are no more helped by that. A few minutes use of the eyes provokes the pain; from which they have vainly sought relief from various physicians, and from various current systems of medical quackery.

Pain is "the tongue of disease" in which effective protest is made against some overstepping of the limits of endurance, by departures from the conditions of healthy living. It only becomes effective after a long period of struggle against some adverse influence, and depends but little on the temporary condition that seems to give rise to it. The tropical asthenopia does not arise from seeing a white face, or ten minutes' exposure to the morning sun; but from the ten years' unnoticed struggle, against what was for that particular organism an adverse influence of vital importance. This may have been excessive light; but it may also have been excessive heat, and other altered conditions of living that finally produce a form of asthenia that leads the body to react by pain, to what was once a normal stimulus.

Much the same is true of the consumptive. The long saturation of his nervous system by the toxins of the tubercle bacillus, while stimulating it to a reaction needed to combat the invasion that threatens the body's destruction, has also come to limit by pain the demands made by even the slight mental and physical effort of reading. Presumably, this is in the interest of the conservation of nerve force, or the equalization of the circulation demanded in combatting the bacillary invader. Unquestionably other persistent infections lead to a similar result as in the headaches of chronic appendicitis.

Careful analysis must be made of the life of the asthenope, who is found in the residue of patients unrelieved by lenses, prisms or exercises. This analysis, differing from the psycho-analysis of Freud, so effective in some cases of "hysteria," but which might be compared with psycho-analysis, will sometimes show us the deep-lying unobtrus-

sive, but long acting causes of his asthenopia, in the patient's previous life.

These patients are generally adults, often nearing middle life, or older, whose habits of nerve action and reaction have long been formed and are well established. Any rehabilitation to be effective must be founded on investigation and inference, going deep and extending far back, and on changes in the habits of using the eyes, or rather the portion of the central nervous system exercised by use of the eyes, which must be persistently insisted on until new habits and reactions are established, at a period of life when they develop very slowly.

A good intellectual appreciation of the essential basis of asthenopia, and the difficulties of removing it, should be followed by a frank discussion of the situation with the patient. These patients have generally been disappointed so often that they are not much disturbed by the lack of any promise of quick and easy relief; and nothing but the patient's intelligent, persistent cooperation, in living and working along the lines indicated for his or her particular case can ever effect a cure.

E. J.

SIZE OF OCULAR FUNDUS DETAILS.

With the ophthalmoscope the parts seen appear magnified, the apparent enlargement increasing from the cornea to the deepest part visible. The extent and importance of this magnification is impressed on one by studying some choroidal or retinal lesion with the ophthalmoscope, and then looking at it after enucleating and cutting open the eye. A piece of steel, seen with the ophthalmoscope suspended in the vitreous, seemed so small when extracted on the tip of the magnet that it was at first quite overlooked in a little clot of blood.

The amount of this enlargement is such that it may easily cause confusion when the same unit of size is used to indicate dimensions, both actual and apparent. Thus a spot has been spoken

of as so many millimeters in diameter, when not its real size was meant, but the size it appeared to that observer when looking at it thru the ophthalmoscope. Such statements are likely to be misunderstood and utterly misleading.

It is even confusing to think of millimeters varying so greatly in apparent size, when the actual size of the lesion has been designated and understood. The millimeter of the retinal lesion looks ten or fifteen times as large as the millimeter of the lesion in the iris or cornea. Whatever method of indicating size is used for distances and spaces within the eye, it should show in itself, or should be accompanied by a statement showing whether real or apparent size is meant.

There are two distinct purposes for which designations of size may be required: (1) To indicate the position of a point or lesion in the fundus, so that it can readily be discovered again; or its size to determine if it is increasing or diminishing so that observations made at one date can be compared with those made on the same eye at a later date. This is the most practical and general need in following a case from time to time. (2) The making of a record that can be embodied in a case report, to indicate the size or position of a lesion, in general units of size or position, that can be used in comparing that case with others and by persons who will never see it.

For both purposes, the landmarks of the ocular fundus itself furnish most convenient units. The optic disc, particularly its diameter, (the disc diameter or d. d.) is a most striking and convenient unit for indicating large dimensions or large distances in the fundus. It is fairly constant both in actual and relative size. Any deductions as to actual size, as in millimeters, must usually be based on the diameter of the disc, assumed to be 1.5 mm. For much smaller dimensions the diameters of the retinal vessels furnish a graded scale. For reexamination of that particular eye, it may be made definite by mentioning a particular vessel; as "diameter of upper temporal

artery at edge of disc," or "double the diameter of the neighboring vein."

The size of the disc remains constant thruout adult life, that of a vessel may vary somewhat; and we cannot lay the scale directly on the thing measured. Still having these units of size directly before the eye to compare with the condition, the size of which is being considered, they have great practical value. The habit of comparing each appearance noted with such a unit increases the exactness of all one's observations.

For recording the part of the fundus in which a certain lesion is seen, the retinal vessels furnish an excellent method. It is easy to note the relation to a particular artery or vein, or to some special branch; as, "the second temporal branch of the upper temporal artery." Or in disc diameters, one may record its distance from the edge of the disc. At the extreme periphery of the fundus, or at the optic disc the clock dial method of notation may be used.

These are not so exact as the plan of fixing the location subjectively, by taking the field of vision and mapping it on a chart, like that suggested by Cowan in the January number (p. 28). But the latter method only applies when the appearance in question causes an interruption of the field of vision; and does not take account of variations in color and appearance before vision has been interfered with, or after it has been lost. The objective and subjective methods supplement one another.

The objective method of projecting the lines of a scale on the fundus, where they can be applied directly to the part to be measured or mapped, is practical with one of the larger fixed or demonstration ophthalmoscopes. But it is scarcely available for the ordinary ophthalmoscopic examination. Even with such a scale, the absolute value of its divisions must vary with the refraction of the eye. So for purposes of an absolute record the accuracy attained is not much greater than by methods more generally applicable.

The important practical points are:

To form some estimate of the size and location of each lesion or peculiarity of the ocular fundus, in units of the fundus itself—the disc diameter or breadth of the retinal vessels. Then the observation should be noted on the case record in unmistakeable terms, preferably of the units above mentioned, in which the sizes have been observed.

E. J.

BOOK NOTICES.

Tropical Ophthalmology. Robt. Henry Elliot, M.D., Sc.D. (Edin.) F.R.C.S. England. Lt.-Col. I.M.S. (Retired), Late Supt. Government Ophthalmic Hospital, Madras, etc. 550 pages, 7 plates, 117 illustrations. London, Henry Frowde, and Hodder and Stoughton.

Reading the title of this work for the first time, one naturally asks, what is "tropical ophthalmology?" Briefly, it is ophthalmology and matters closely related to it, as these are presented to one engaged in ophthalmic practice in a tropical country. For his material, the author has drawn largely on his own experience in India. But he has also had the assistance of numerous colleagues in that field of practice, and has used freely the records, now rapidly accumulating, regarding ophthalmic practice in many other tropical countries of the world.

The reader already familiar with the practice and literature of ophthalmology will find here much already known to him. But it is discussed from a viewpoint and in relations essentially new, which add to this statement of it new value and interest. We know of no book on ophthalmology recently published in which the ophthalmologist of the western temperate zone will find so much of interest and profitable entertainment. It is an account of ophthalmic practice not only in the tropics and in the Far East, but among different races and often under very primitive conditions.

The work is divided into ten sections from the headings of which one may gather a list of the classes of facts that give novelty and interest to these pages. First we come to the effects of exposure of the eyes to strong light,

and then to the wind and dust of tropical countries. The injuries inflicted on the eye by animals include those caused by flying insects, chemical injuries by other animals, injuries by stings and bites and the invasion of the lids and eyes by small arthropods. The sections on parasitic diseases of the eye, divided into four parts, includes 15 short chapters devoted to different classes of such parasites.

The Indian Operation of Couching for Cataract is the subject of one section; and the next is devoted to Cataract Extraction. In the chapter on methods of operating the author says, "There are two distinct methods of operating for cataract—(a) By delivery of the lens entire in its capsule—the so-called Intra-capsular Operation; and (b) by opening the capsule, and leaving it or the main bulk of it behind, while the lens substance is expressed—the Capsule-Laceration Operation." After stating the claims made for each method, this advice is given: "The author has no wish to prejudice the young surgeon in either direction, but since his object is to make this chapter as practical as possible, he would confine himself to saying that, in his experience, and he has tried both methods freely, the capsule-laceration operation is both easier and safer than the other. It is, therefore, to his mind the obvious method for beginners. He would most strongly advise all those who can do so, to visit the men whose cataract opportunities are large, to see their work at first hand, and then to decide which method they will adopt, or whether they will use both according to rules which experience leads them to formulate for themselves."

Lt. Col. Kirkpatrick, the present superintendent of the Government Hospital there, has written the chapter on "The Madras Cataract Operation." This operation is peculiar in that the capsule is always lacerated with a needle before making the corneal section. This procedure gives evidence regarding the size of the nucleus and its consistence, which may be helpful in planning the size of the corneal incision. Then for the removal of cortex and the toilet of the wound reliance is

placed largely on irrigation of the eye; usually without introducing the nozzle of the irrigator within the wound. Some warnings and rules based on Col. Elliot's large experience in teaching beginners, and his observation "that practically every man who has not had large practice makes identically the same mistakes," are full of great practical wisdom.

There are over 50 pages devoted to diseases of the conjunctiva, cornea, lids and lacrimal passages, giving light new to most of us, even on trachoma and lacrimal obstruction. Then comes a section headed "Miscellaneous" in which the author makes brief mention of glaucoma, saying nothing of methods of operative treatment, except a good description of optico-ciliary neurectomy for blind painful eyes. This operation the native Indians greatly prefer to the enucleation that would be practiced in Western Europe or America.

In the same section we find some very interesting statements of statistics given by Lt.-Col. Kirkpatrick in an account of ophthalmoscopic appearances in the tropics. "Careful notes on over 500 cases of fundus disease, taken at the Madras Ophthalmic Hospital, show a rate of over 60 per cent of venereal disease, and in all probability the infection is even higher than this."

Ocular sepsis, chiefly pyorrhea, was found in over 47 per cent of fundus disease cases. Consanguinity of parentage exists in about 60 per cent of the general community, and in 71 per cent of the fundus cases. "Optic atrophy represents 32 per cent of all fundus disease, and retinitis pigmentosa nearly 12 per cent." The latter constitutes 21 per cent of all diseases of the choroid and retina; and among these cases, 87 per cent furnished a history of consanguinity.

Sun blindness has especial importance and interest in India, because "it is part of the Brahmin ritual to look at the sun whilst reciting a particular 'mantram' during the midday prayer." The account of sun blindness given in the second section of the book is in many respects the best that has yet

found its way into any text book of ophthalmology.

The final section on General Diseases includes, in about 100 pages, the ophthalmic aspects of such affections as Beri Beri (written with the help of Professor Miyashita of Osaka, Japan), Cholera, Dysentery, Leprosy, Malaria, Quinin Poisoning, Pellagra, Plague, Smallpox, Trypanosomiasis, Yaws (written by Dr. Louis Sambon) and nine other diseases.

The value of this book for the student, and as a work of reference, is greatly enhanced by references to the literature, given with the account of each subject at the end of each chapter; the full but not overloaded index of subjects; and the index of names of authors cited, including many from the literature of the last three years. It is written thruout in the clear easy English of which its author is a master. We welcome it to the standard literature of ophthalmology. E. J.

Cure of Imperfect Sight by Treatment without Glasses. By W. H. Bates, M.D. 313 pages. 55 illustrations. New York. Central Fixation Publishing Company, New York City.

The purpose and character of this book can best be stated in the author's own words. In front of the title page and frontispiece, is a page stating:

"THE FUNDAMENTAL PRINCIPLE.

"Do you read imperfectly? Can you observe then that when you look at the first word, or the first letter, of a sentence you do not see best where you are looking; that you see other words, or other letters, just as well as or better than the one you were looking at? Do you observe also that the harder you try to see the worse you see?

"Now close your eyes and rest them, remembering some color, like black or white, that you can remember perfectly. Keep them closed until they feel rested, or until the feeling of strain has been completely relieved. Now open them and look at the first word or letter of a sentence for a fraction of a second. If you have been able to relax, partially or completely, you will have a flash of improved or clear

vision, and the area seen best will be smaller."

In the preface, the author states that he "aims to give a collection of facts and of theories." But he makes no distinction between an established theory and an unsupported hypothesis. "The explanations of the phenomena of sight put forward by Young, von Graefe, Helmholtz and Donders have caused us to ignore or explain away a multitude of facts, which otherwise would have led to the discovery of the truth about errors of refraction and the consequent prevention of an incalculable amount of human misery." Dr. Bates speaks of his book as, "presenting my experimental work to the public," and says, "As there has been a considerable demand for the book from the laity, an effort has been made to present the subject in such way as to be intelligible to persons unfamiliar with ophthalmology."

The things stated as facts include a curious medley. Cases of unexplained apparent accommodation after extraction of the lens are cited as proving that the current views regarding accommodation are all wrong; sweeping aside the many facts of common observation upon which they have been established. Showing that the curvature of the cornea and the length of the eyeball can be changed by external pressure or muscular action, it is assumed that this is the usual way in which ocular refraction is modified.

In the chapter headed "Simultaneous Retinoscopy," we are told "The test card and trial lenses can be used only under certain favorable conditions, but the retinoscope can be used anywhere. It is a little easier to use it in a dim light than in a bright one, but it may be used in any light, even with the strong light of the sun shining directly into the eye. It may also be used under many other unfavorable conditions."

"It takes a considerable time, varying from minutes to hours, to measure the refraction with the Snellen test card and trial lenses. With the retinoscope, however, it can be determined in a fraction of a second. By the former method it would be impossible, for instance, to get any information about the refraction

of a baseball player at the moment he swings for the ball, at the moment he strikes it, and at the moment after he strikes it. But with the retinoscope it is quite easy to determine whether his vision is normal, or whether he is myopic, hypermetropic, or astigmatic, when he does these things; and if any errors of refraction are noted, one can guess their degree pretty accurately by the rapidity of the movement of the shadow."

Each of our readers, who knows something of the shadow test, can decide for himself whether the above is a statement of fact or of fancy. If he feels interested to go further, he will find in this book many other statements quite as striking, and quite as opposed to his ordinary experience.

It is curious to see how ordinary facts can be looked at in such a way as to lose their usual relations and significance, taking on many of the characteristics found in the observations in "Alice Through the Looking-glass," and the teachings of "Science and Health."

E. J.

CORRESPONDENCE.

Cataract Extraction.

To The Editor: In the Ohio State Medical Journal for August, 1920, Dr. D. T. Vail criticizes the operation of cataract extraction as usually performed, that is with capsulotomy and expression of the lens, leaving part of the capsule behind, "because it is only applicable to ripe or nearly ripe cataracts. The capsule on a live lens adheres to the cortex, and when left within the eye, frequently causes dense after-cataract, which is far worse than the original cataract." Since this opinion, altho so positively stated, and coming from one of unusual skill and experience, is not the opinion of all other operators and observers, it seems to me that it should not be permitted to go unchallenged.

The capsulotomy operation is not "applicable only to ripe or nearly ripe cataracts." Twenty or more years ago, Weeks called attention to the ease with which even clear lenses could be extracted in persons of advanced age, since the lens is well sclerosed, regardless of

its transparency or lack of transparency. This observation was made on the cadaver, and subsequently confirmed on the living, and the opinion was then given that the extraction of unripe cataracts by the ordinary operation was a safe and justifiable procedure. I can confirm this from a considerable experience, and could recite many cases in which the lens was successfully extracted altho far from completely opaque, and often when the fundus of the eye was still visible with the ophthalmoscope.

Dr. Vail further states that "the best time to operate is before senility and blindness have set in," and with this I heartily agree. He also says that "my experience in the newer technique has taught me to believe that it is reprehensible to allow the patient to go blind from cataract before operating." So has mine, except as to the "newer technique," by which he means the Smith Indian operation. Those of moderate experience, in which category I place myself, have hesitated to undertake the Indian operation. It seems to be a formidable procedure, and upon one occasion when I had the pleasure of seeing Dr. Vail himself operate, difficulties arose which taxed even his resources, and would have been disastrous to an operator less experienced.

With reference to the adhesion of the capsule to a "live" lens, the author refers to the "removal of the anterior capsule from the eye in the case of immature, mature or hypermature cataract" by his capsule forceps, as a "distinct advantage over leaving it within the eye," so that it is not impossible to remove it, and when this is done, one is not doing the Indian operation. It is admittedly more adherent to unripe than to ripe cataracts, and also it admittedly causes after cataract when it is left, in many instances. But others will certainly not agree that this after cataract is "far worse than the original cataract." The vast majority of after cataracts can be successfully and safely disposed of by a simple, brief and painless procedure, with confinement for not more than 24 hours. I do not mean to say that all are so simple, but the vast majority are.

That Dr. Vail's results with the Indian operation are excellent, no one doubts, but the results obtained by other oper-

ators by other methods will compare favorably with the results of the Indian operation in every particular. Speaking for myself, the objections and difficulties which he urges against the operation as done by the large majority of operators, in this country at least, do not exist.

I agree with Dr. Vail that a patient with a cataract in his only eye or in both eyes, should be operated on at an early period, as soon as he has an embarrassing failure of vision; and the operation can be safely done by any one competent to do cataract operations at all if the following points are observed.

(1) Complete anesthesia. Local anesthesia is nearly always sufficient, and should be obtained by repeated instillation of the anesthetic, supplemented at the last with a drop of adrenalin. If an iridectomy is contemplated, or if the patient is sensitive, the subconjunctival injection of the anesthetic is very helpful.

(2) Quiet in the operating room. Many an otherwise docile patient has been upset to the point of losing his self-control by irrelevant talking in his presence, unnecessary noise of all sorts, needless delays, etc. A little assuring talk from the surgeon is a great help, and after that no one should address the patient but the operator.

(3) The patient should be told how to relax, and made to do so. The best single means to that end is to make him open the other eye. This is a very essential matter in my experience, yet its value is not appreciated in many clinics that I have had the pleasure of visiting.

(4) A large corneal incision is essential. The position of the incision is not now under discussion, but is should be ample in size.

(5) A free capsulotomy. I agree with Dr. Vail as to the great advantage of the capsule forceps for this purpose. My personal preference is for the Kalt forceps; and with this instrument the zonule will often rupture and the lens will be delivered in the capsule, as advocated by Stanculeanu and Arnold Knapp. If the capsule tears, a generous piece is usually removed, facilitating the delivery of the lens. I prefer that this should happen, as the exposure of the vitreous, which happens when the lens is delivered in the capsule, has seemed to me to result in a

greater proportion of vitreous opacities and consequent disturbance of vision. This may not be the experience of others.

(6) A careful toilet of the wound. Nothing so contributes to excessive reaction as the retention of portions of cortical matter in the eye, and nothing so well repays one for the time spent as a proper toilet of the anterior chamber. The method of irrigation by washing past the wound with a pipette has seemed to me to be entirely futile, while the introduction of a slender irrigating tip into the pupillary space is much more effective. Best of all seems to be the "suction curette." This procedure can be safely and effectively carried out if a corneal suture is used, but I did not write this letter to advocate the use of the corneal suture.

Another reason for advocating early operation is to put a stop to that pitiful procession of the hopelessly blind who come to the offices of eye surgeons after they have followed someone's advice to wait "till their cataract is ripe" before seeking relief. If they can be taught that this wait is not necessary, but that they can be relieved at a much earlier period than that of total blindness, many, many eyes would be saved from glaucoma by being brought under observation at a time when something could be done for them.

Yours very truly,
E. C. ELLETT.

Memphis, Tenn.

The Stereoscopic Appearance of Certain Pictures.

To the Editor:

Dr. F. W. Edridge-Green writes under the above title in "Nature," November 18, 1920, p. 375:

"In a demonstration, which I gave before the Physiological Society (*Journal of Physiology*, Vol. 48, 1914), I showed that the perception of binocular relief is independent of double images of the two retinae similar to those which are presented by an object in the field of vision. This can be shown by taking a pair of stereoscopic photographs in which the point of sight is at the center of each and cutting them vertically in two, and then, having pasted the left half of the left photograph on the left side and the right half of the right photograph on the right

side on white or black cardboard at an appropriate distance, so that there is no overlapping when placed in the stereoscope, a picture in striking relief is obtained when combined together in the stereoscope. In this case it will be noticed that there is no portion common to both fields of view. In each case the overlapping portion is combined with white. It seems probable that this is how binocular vision takes place in ordinary circumstances. If an object in high relief—as f. i. vase or the face of a person—be viewed at a short distance and one particular point fixated, it will be noticed that the right eye dominates the right side of the field of vision and the left eye the left side, as may be proved by noticing the relation of surrounding objects, and closing first one eye and then the other alternately."

As it seems from referring to the publication in 1914 this viewpoint has not been contradicted in the English literature: nor have I seen a reference to it in any subsequent numbers of "Nature." Even now the above statement seems to pass unnoticed. Shall this opinion, which reverses all our notions of Binocular Single Vision be accepted unchallenged? It is remarkable how an ophthalmologist can conceive such an absurdity. It seems to me, however, that the same can be traced to a misunderstanding of what happens when we see thru a stereoscope.

"Stereoscopic vision," or the visual impression received by seeing with a stereoscope, is not the same as "perception of depth." Stereoscopic vision is an "abnormal binocular vision." We see thru a pair of positive lenses, which are combined with adducting prisms. The positive lenses replace the lenticular accommodation, so that a clear perception can take place at the focal distance of these lenses (usually at about 20 centimeters). The adducting prisms help in bringing the visual axes in a parallel position.

As not everybody has learned to make his accommodation independent from his convergence, it often takes a certain amount of time before appreciating the stereoscopic effect of a picture. When we look for stereoscopic effect at a picture the following happens: Trying to

bring our visual axes in parallelism the two images seen with the right eye are projected to the left and the two seen with the left eye are projected to the right. We first see four pictures. If stereoscopy takes place the right image of the right eye will come together with the left image of the left eye, so that only three images are seen, the middle of which shows the stereoscopic effect. This happens for the "free" stereoscopy. Using the instrument we only notice the middle picture, as the partition between the lenses which projects forward excludes for each eye the outward picture.

If we now repeat Dr. Edridge-Green's experiment we do not need to cut a stereoscopic picture in two and paste each part—as he describes—on another piece of paper, but we can simply cover the middle part of the photo with a piece of paper. Such a stereoscopic picture put in the instrument will undoubtedly show a stereoscopic effect, *but this is the result of the pictorial arrangement*, and goes to show that we can get stereoscopic effects even without fusion of two nearly similar impressions. We know from daily life how important the secondary impressions are, as e. g., the perspective representation, the shading, etc.

Dr. Edridge-Green can never prove his position with pictures, which demand Synthesis—and these are the only valuable ones for proving the stereoscopic impression. Everyone can convince himself of this. Take Javal's well-known drawing of the two unequal arrows, appearing among other publications in Helmholz' Memorial, which produces the impression of being turned at right angles, or the type of pictures, of which Würdemann published an example in the A. J. O., 1914, and which is exemplified in the Stereoscopic Test Chart of Bausch and Lomb.

If, in these cases, the inner halves of the stereoscopic charts are obliterated, either by cutting out or covering, one can not get stereoscopic effects.

The above can be easily verified. Any opinion, therefore, which questions the fact that the right visual field partly covers the left one and that this produces in the brain the fusion of these impressions, which becomes exteriorised as "the per-

ception of depth" is, I repeat, an absurdity.

If Dr. Edridge-Green's opinion were correct, there would not be any difference between "Simultaneous Vision" and the socalled "Stereoscopic Vision."

See also the writer's article, "Binocular Single Vision," in the Transactions of the Section of Ophthalmology of the A. M. A., 1917.

DR. E. E. BLAAUW,
Buffalo, N. Y.

BIOGRAPHIC SKETCHES.

THOMAS H. SHASTID, M.D.,
SUPERIOR, WISCONSIN.

CAMPBELL, JOHN FRANKLIN, of Chicago, was born in Ontario, Canada, on Yonge St., north of the city of Toronto, Jan. 17, 1864; being a son of John and Carolyn Clay Campbell, and the eldest of seven children. Having attended the public schools of Toronto, he taught therein for about three years. His medical degree was received at Toronto University. After three years' practice in Toronto, he went to Scotland, where he pursued a course of graduate study in medicine for about a year, and became a licentiate of the Royal College of Edinburgh and Glasgow. Removing to Chicago, he practiced there until his death. On August 12, 1908, he married Miss Inez Olds. There were no children. In his later years Dr. Campbell confined his attention to diseases of the eye, ear, nose and throat.

Dr. Campbell was a man of strong character and lofty ideals. He was an active church worker of the Presbyterian Church. An intimate friend writes, "He held the Christian faith to be the supreme principle of human life."

Dr. Campbell died July 14, 1920. Masonic funeral services were held on the following day, America Lodge officiating. The interment was at Toronto, Canada.

MOORE, FONTAINE BRUCE. Born at Helena, Ark., April 6, 1886, son of Dr. Frierson and Annie Laurie Moore, he received his medical degree at the University of Pennsylvania in 1911. He practiced as a specialist on the eye, ear,

nose and throat at Memphis, Tenn. He was a member of the Memphis Society of Ophthalmology and Oto-Laryngology, a Fellow of the American Academy of Ophthalmology and Oto-Laryngology, Lieutenant, M. C., U. S. A. (discharged Dec. 27, 1918) and Clinical Assistant in Otology at the Medical Department of the University of Tennessee. He married Miss Florence Shelton. Dr. Moore was of medium height, stout, of dark complexion, quick and active in manner, very cordial and friendly; a collector of books, stamps and coins. He died Nov. 27, 1920, of lobar pneumonia.

MORGAN, JOHN. Born in 1845, he received his medical degree in 1869 at Yale University. He practiced at Springfield, Mass., at Boston, Mass. (for 22 years) and, for the last few years of his life, at New York City. He died of heart disease at Hadlyme, Conn., Aug. 30, 1920.

Concerning the personal characteristics of Dr. Morgan, we append the following from Philip Hale:

"It was not easy to obtain from him a bill for the service rendered, whether it was an operation for cataract, or merely a prescription for spectacles; and when a bill was finally extracted from him, it was always modest, sometimes ridiculously so. Brusque in manner, he was the personification of kindness. In the report of his death it was stated that 'one of his whims was to pick out newsboys and street urchins who had eye ailments and give them free treatment.' This was not a passing 'whim.' During his years in Boston, he gave many professional men, who were constantly using their eyes,

sometimes abusing them, free treatment, in spite of their protest."

NUNN, RICHARD. An Irish-American ophthalmologist and oto-laryngologist, professor of diseases of the eye, ear, nose and throat in the University of Oregon Medical School, a son of J. Wesley Nunn, County Wexford, Ireland, born about 1859. His medical degree was received at the University of Dublin, in 1883. Dr. Nunn's life would seem to have been a succession of tragedies. Made heir to his father's estate, he became, for some reason, unable to enjoy its emoluments. He therefore removed to America, and, though nominally the heir of a very fine Irish estate, had little property or cash. About 1900 he married Emilie Trevett, by whom he had several children. Of these the eldest and the youngest were drowned—a loss from which the Doctor seems never to have recovered. In May, 1915, he went to England and joined the Royal Army Medical Corps. Passing over to France, he was found unable to endure the physical hardships, and was invalidated back to England—an occurrence which broke his heart, for he was never again the same person either in body or in mind. Twelve months after the armistice was signed, he was mustered out, and returned to America.

Afflicted with insomnia, he resorted to opiates, and died of an overdose, August 17, 1920.

In his younger days, Dr. Nunn was a well known rower, having been on the London Rowing Club eight. He was large, lean, mustached, with ruddy complexion, gray eyes and brown hair.

ABSTRACTS

Goerlitz, M. Blindness after Extreme Loss of Blood. Klin. M. f. Augenh. v. 64, 1920, p. 763. (ill.)

Goerlitz relates the clinical history of a man, aged 57, who ten days after a severe hemorrhage from a duodenal ulcer became totally blind, and died several days later. The optic discs were opaque and edematous without

definable borders from, in a large extent, the whitish, opaque, edematous retina. The vessels were scarcely visible on the disc, in general very thin and pale, no venous stasis, two slight hemorrhages. Five days later, the pupil very immovable to light. The opacity of the discs had decreased, so that the border could be discerned. The color

had in general become more white, vessels better filled. From the start both eyes sunken in the orbits, conjunctiva completely anemic.

The microscopic examination revealed in both eyes an intense edema of the disc extending into the layer of nerve fibres, and between these, were peculiar nodules, projecting on the surface. They consisted of accumulations of polymorphous, partly nucleated, formations, terminating in a pointed process. Immediately at and behind the lamina cribrosa were circumscribed foci of degeneration, in which the medullary sheaths were destroyed. Their position and configuration reminded Goerlitz very much of the foci of degeneration in multiple sclerosis. Probably, they are caused by the edema of the optic nerve and its surrounding fibres, due to changes of the vascular walls, possibly thrombotic processes.

For treatment, Goerlitz suggests the transfusion of blood.

C. Z.

Haab, O. E. Iron Splinters Removed from Interior of the Eye. Archiv für Augenheilkunde Bd. 84, 1918.

The son of Prof. Haab is following in his father's footsteps, being given an opportunity for observation of penetrating injuries of the eye by iron particles that is unique. The peasants of Switzerland till their stony ground largely with a mattock, a species of heavy hoe, which, being made of rather crude steel, is daily chipped in the progress of their work and thus the larger number of this character of foreign bodies seen in Switzerland comes from the use of this implement. "Bowed with the weight of centuries he stands," and is often blinded by this crude method of tilling the ground.

Our literature does not note anything special about the form, the weight, or the character of metal splinters. The elder and the younger Haab have removed 370 such splinters in the course of the last 35 years, mostly by the giant magnet, and 243 of these were saved for specimens. It was found that when the foreign body had been in the eye only a few days, its

color and shape were changed by rust. This depends upon its degree of hardness, the softer metals rusting more quickly.

The origin of the specimens could usually be denominated from their color, size and shape. The hoes and mattocks used in Switzerland are very wide and heavy. The edge is not very sharp and hence chips broken off are of irregular shape and fairly large, in contrast to those from hatchets, hammers, chisels and other tools which have sharper cutting edges and are of better steel. From these the foreign bodies are usually smaller, bright and of quite irregular shape, being mostly rhomboidal, about two or three times as long as they are wide or thick. The splinters are deformed and usually do not fit well in the hole of the tool from which they came. They are usually larger on account of the change in their shape, softer metal objects being more deformed than those from hard steel.

Of the matrix the Haabs were able to secure but two out of the many hoes and mattocks which had caused these injuries. Of the other tools they generally tried to secure the offending tool to note its composition. It is practically always a splinter from the tool that causes the injury, rather than that of another piece of metal upon which the tool was used.

The splinters which had penetrated the eye varied in weight from 0.001 to 0.10 grams, 40% of them weighing from 0.001 to 0.005. The author gives numerous diagrammatic illustrations of objects, showing the methods of production of these splinters, the direction of the force, the sizes and shapes, with tables and diagrams. Of much interest is a photograph of a large number of these foreign bodies from the interior of the eye, which have been removed by the magnet.

H. V. W.

Baldino, S. A New Apparatus for the Determination of Heterophoria. Arch. di Ottal., v. 27, 1920, p. 57.

The author's apparatus is based on the "Hole in the Hand" experiment. It is somewhat similar in its use of

this idea to the device proposed by Cantonnet. It consists in two tubes 20 cm. long, resting on a horizontal bar, which is supported on a tripod. Both tubes are movable in any direction, and can be twisted on their long axis, each movement being recorded on a scale reading in prism angles. The distance between the tubes is adjustable from 40 to 70 mm.

In making the test for infinite distance, the tube of the fixing eye is left open, the other tube contains an opaque disc with a small hole prolonged into a slit above and below. The observer, fixing any distant object through the open tube, is asked to superpose the small hole on this object by moving the tube containing it, the

amount of movement laterally or vertically registering his heterophoria.

If the slit appears slanted he is to turn the tube till it is vertical, registering his cyclophoria. For any given distance, the heterophoria is calculated by means of a table based on the orthophoric subject at the various distances.

The chief advantages claimed for this over Cantonnet's apparatus and other devices are:

1. It determines all forms of heterophoria directly in prism angles.
2. Serves for distant and near tests.
3. Measures cyclophoria.
4. Aids in examining the muscle-balance in the upper, lower, and lateral fields.
5. Has an adjustable base line.

S. G.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS.

Sir W. de W. Abney, writer on color vision, died in London December 3, at the age of 76.

Thomas W. Delany, of Dublin, Hon. Secretary of the Irish Ophthalmological Society, died Oct. 10, 1920.

John E. Harper, Emeritus Professor of Diseases of the Eye in the College of Physicians and Surgeons, Chicago, died from myocarditis, January 8, 1921, aged 69.

Dr. A. von Szily, Professor of Ophthalmology at Budapest, author of numerous papers on ophthalmology, father of Dr. Aurel von Szily, died November 20, 1920, at the age of 73.

PERSONALS.

Dr. George E. Bellows, ophthalmologist in Kansas City, was elected president of the Jackson County Medical Society for 1921.

Dr. L. Webster Fox, Philadelphia, will spend three weeks on a holiday trip, fishing in Florida.

Dr. George E. de Schweinitz, Philadelphia, returned on Tuesday, January 4, from a holiday trip to Bermuda.

Dr. Melville Black, Denver, has recovered from an operation for appendicitis, and is spending a two months' vacation in Honolulu.

William Hislop Manson has been appointed to the Chair of Ophthalmic Medicine and Surgery in the Anderson College, Glasgow.

Dr. J. Gonin has been appointed Professor of Clinical Ophthalmology in the University of Lausanne in succession to the late Professor.

Dr. G. Oram Ring will leave Philadelphia the latter part of January to join friends on a houseboat at Fort Meyers, Florida, for a fishing trip.

The Middlemore Prize has been awarded to Harry Moss Traquair for his essay on perimetry, its methods and its value to the ophthalmic surgeon.

Dr. A. Noceti, Professor of Ophthalmology at the University of Buenos Aires, has resigned his chair on account of lack of time for its duties.

Dr. A. H. H. Sinclair has been appointed an ophthalmic surgeon and Dr. E. H. Cam-

eron an assistant ophthalmic surgeon to the Edinburgh Royal Infirmary.

Dr. Clarence Loeb, of Chicago, conducted a Clinic Hour and gave a special address before the December meeting of the Milwaukee Oto-Ophthalmic Society.

Dr. L. S. Bressler, formerly of Brooklyn, N. Y., has moved to Chicago, where he has opened an office at 6255 South Ashland Ave., to continue the treatment of eye, ear, nose and throat diseases.

Dr. Thomas Dowling wishes to announce that he is now associated with the Mason-Blackford-Dowling Clinic of Seattle, Washington, in the practice of ophthalmology, rhinology and oto-laryngology.

At a meeting held on October 20, Dr. George MacKay was reelected President of the Royal College of Surgeons of Edinburgh. Dr. Freeland Fergus has been reelected President of the Royal Faculty of Physicians and Surgeons of Glasgow. Mr. R. H. Dickson, of Newcastle, Staffs., has been elected President of the North Staffordshire Medical Society.

In celebration of his eighty-fourth birthday, Dr. W. W. Keen, surgeon emeritus of Jefferson Medical College of Philadelphia, was tendered a dinner and reception at the Bellevue-Stratford, Philadelphia, on the evening of Thursday, January 20. Dr. George E. de Schweinitz was toastmaster. Addresses were made by Rev. Dr. Faunce, President of Brown University; Hon. David Jayne Hill; Dr. William H. Welch, of Johns Hopkins University; Dr. J. C. DaCosta, professor of surgery at Jefferson Medical College; the Hon. Elihu Root. The Philadelphia ophthalmologists on the Committee of Arrangements in addition to Dr. de Schweinitz were Dr. Howard Forde Hansell, Dr. McCluny Radcliffe and Dr. G. Oram Ring.

SOCIETIES.

The annual meeting of the Ophthalmological Society of Egypt will take place at the School of Medicine, Cairo, March 4, 1921.

The Milwaukee Oto-Ophthalmic Society held their annual meeting January 18, 1921. The following officers were elected: Dr. J. S. Gordon, president; Dr. E. H. Brooks, vice-president; Dr. J. E. Guy, secretary and treasurer.

The January meeting of the Kansas City Eye, Ear, Nose and Throat Club was held on the twentieth. An afternoon operative clinical program was given at the hospitals, followed by a dinner. Papers were presented by Drs. Hal Foster, E. L. Russell and Sam Roberts.

At the January meeting of the Ophthalmic Section of the College of Physicians of Philadelphia, the following officers were elected to serve for the coming year (1921): Chairman, Dr. G. Oram Ring; Secretary, Dr. Charles R. Heed; Executive Committee, Dr. Howard Forde Hansell, Dr. William T. Shoemaker, and Dr. George E. de Schweinitz.

On January 10, 1921, the St. Louis Oph-

thalmological Society and the St. Louis Ophthalmic Conference effected a merger. The new organization adopted the name, "The St. Louis Ophthalmic Society." Officers for the ensuing year were elected as follows: President, A. E. Ewing; Vice-president, F. E. Woodruff; Secretary-Treasurer, Wm. F. Hardy; Editor, John Green, Jr.

The Sioux City Eye and Ear Society has recently been organized with the purpose of meeting once a month during the winter months, for scientific discussions. The officers of the society for the present year are: President, Dr. James E. Reeder; vice-president, Dr. F. L. Secoy; secretary-treasurer, Dr. T. R. Gittins.

The officers for the Section on Ophthalmology of the Royal Society of Medicine for 1920-21 are as follows: President, James Taylor; vice-presidents, E. Treacher Collins, William Lang, A. Maitland Ramsay, J. B. Story, E. E. Maddox, Sir Arnold Lawson, and W. T. Holmes Spicer; honorary secretaries, M. L. Hepburn and W. H. McMullen.

The next meeting of the Oxford Ophthalmological Congress will be held at Keble College, Oxford, on July 6, 7 and 8. The discussion, to be opened by Dr. Victor Morax, will be on "The Causes of Infection after Extraction of Senile Cataract." The Doyne Memorial Lecture, by Mr. E. E. Maddox, will deal with "Heterophoria."

At the annual meeting of the Chicago Ophthalmological Society, held on January 17, the following officers were elected for the ensuing year: President, Dr. Ephriam K. Findlay; secretary, Dr. Michael Goldenburg; corresponding secretary, Dr. Robert Von der Heydt; councilor, Dr. C. O. Schneider. Dr. John E. Weeks of New York was a guest at the dinner at which about a hundred members of the society were present.

The Louisville Eye and Ear Society held a banquet on January 13 in Louisville in honor of Dr. A. J. Stuckey of Lexington, who was recently elected president of the Kentucky State Medical Association. Besides the twenty-five local members of the society, there were present twenty eye and ear specialists from neighboring cities. Addresses were made by Dr. Dan Griffiths, Owensboro; Dr. Stuckey and Dr. Adolph O. Pfingst, Louisville. Dr. Walter Dean was elected president, and Dr. Gaylord Hall secretary for the ensuing year.

The American Academy of Ophthalmology and Oto-Laryngology will hold its twenty-sixth annual meeting October 17-22, inclusive, in Philadelphia. The regular scientific program will be presented on the 17th, 18th and 19th. This will be followed on the 20th, 21st and 22d by an intensive postgraduate course on ophthalmology and oto-laryngology, due notice of which will be given by the committee in charge. Professor J. Van der Hoeve, of Leiden, Holland, has accepted an invitation to be the guest of honor of the Academy.

MISCELLANEOUS.

BOOK NOTICES. There is a Post Office ruling that makes it impossible for magazines to publish book prices without materially increasing the cost of publication. The second-class postage rate is figured separately on editorial and advertising matter. The ruling reads:

"Reviews will be regarded as matter other than advertising for the purpose of determining the postage chargeable on the publication, *provided the prices of the books are not given* and the reviews are otherwise free from features tending to give them the appearance of being designed to promote the sale of the books."

A Prize in Ophthalmology: Mr. and Miss Edmonds, of Wiscombe Park, Colyton, England, have founded a prize in ophthalmology in memory of their brother, Nicholas Gifford Edmonds, who fell at Magersfontein on Dec. 11th, 1899. The prize is one hundred pounds and is awarded every two years for the best essay on a subject dealing with ophthalmology, and involving original work. The competition is open to all British subjects holding the medical qualification. The management of the prize will be in the hands of a committee nominated biennially by the Medical Board of the Royal London Ophthalmic Hospital, who will select the subject of the essay and elect two examiners. The winner of the prize will have the option of giving a lecture on the subject at the Royal London Ophthalmic Hospital. The Middlemore prize, awarded triennially and run on very similar lines, has rendered valuable service to ophthalmology, and many of the prize essays remain as standard works.

The Illinois Society for the Prevention of Blindness, jointly with the State Department of Public Welfare, the State Department of Public Health, and the American Red Cross, in May, 1920, initiated a campaign against trachoma in several counties in the southern part of the State.

By means of a series of free clinics for the examination and diagnosis of eye ailments, which were conducted over a period of six months, it was disclosed that trachoma exists in some sections of the State to an ex-

tent which makes it a very serious menace to the sight of all citizens.

A total number of 2,700 patients were examined at these clinics, more than half of this number were children of school age. It was found that 20% of all the patients had trachoma, and of these trachoma patients, 26% were blind when they referred to the clinic (blindness estimated on a basis of 2/10 vision in the best eye). The average age of the trachoma patient is 34 years.

In the follow-up work with the patients of these clinics, which included inspection of the lids in pupils of the public schools in the communities under consideration, groups of school children numbering as many as fifty in a single community were found with trachoma in an infectious stage, and in attendance upon school.

At the time the campaign was initiated, Illinois had, in common with many other States, the usual regulation that trachoma shall be reported as a contagious disease, to the State Department of Public Health; no authority existed for exclusion from school or from other public gatherings, for either adult or child, who should have trachoma in its infectious stage. It was also discovered that practically no reports were being recorded with the State Department, and it was early apparent that the existing regulation for the control of trachoma must be supplemented by much more drastic requirements for the isolation of patients until treatment should remove the danger of contagion.

The State Department of Public Health gave splendid cooperation at this point in the amendment secured to the existing regulation, which gives Illinois probably the most drastic and comprehensive law for the control of trachoma, which exists.

Moreover, these requirements are working effectively in securing prompt treatment of school children with trachoma; they are being enforced by the school authorities, assisted by the cooperation of local physicians, and public-welfare organizations, with the result that in communities where the campaign is still active, as high as 95% of the pupils are found to be under treatment within a week after exclusion from school.

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FIG. 1. HYALOID ARTERY AND CANAL OF CLOQUET.
LEFT EYE, ERECT IMAGE. (DANIS' CASE 1.)



FIG. 2. PERSISTENT HYALOID ARTERY AND CANAL OF CLOQUET.
LEFT EYE. (DANIS' CASE 1.)

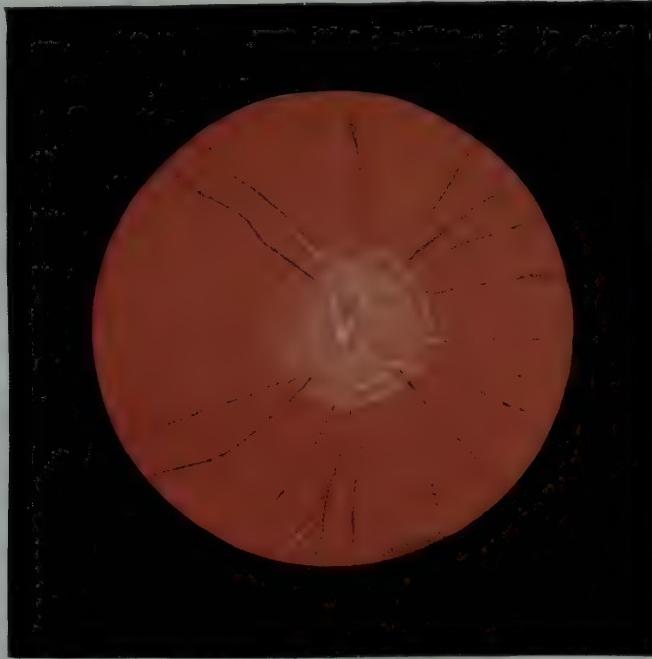


FIG. 3. NEUROGLIAL REMAINS ON THE PAPILLA, EPIPAPILLARY MEMBRANE. RIGHT EYE, ERECT IMAGE. (DANIS' CASE 2.)



FIG. 4. ANOMALOUS PROLONGATION OF THE LAMINA CRIBROSA. RIGHT EYE, ERECT IMAGE. (DANIS' CASE 3.)

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CONGENITAL ANOMALIES OF THE FUNDUS OF THE EYE.

MARCEL DANIS, M. D.

BRUSSELS, BELGIUM.

This paper reports the ophthalmoscopic appearances found in three cases. In one there was a persistent hyaloid artery and visible canal of Cloquet. In the others there was present a membranous, more or less opaque structure, in front of the disc. This was designated in one case an epipapillary membrane and in the other an anomalous prolongation of the lamina cribrosa. Color plates 4 and 5 show the appearances observed. Read before the Belgian Ophthalmological Society, November 28, 1920.

PERSISTENT HYALOID ARTERY AND CANAL OF CLOQUET

CASE 1. R. Frederic, aged 24 years. presented a divergent strabismus, the left eye deviating outward; its vision reduced to counting fingers at 1 meter and not improved by lenses. Its refraction is myopic and 3 D. of astigmatism (horizontal meridian — 12 D., vertical — 15 D.) The pupil reacts to light, the iris presents no lesion, and is of a light blue color identical with that of the iris of the right eye. The external membranes are normal.

The ophthalmoscopic image of the left eye presents the following peculiarities (see plate 4, Fig. 1).

The papilla is covered by a flask-shaped mass, a little larger than the normal papilla, protruding to about 4 diopters, of a pale pink color, the center presenting a slight depression from which comes out a vessel, passing over the flask and directing itself downward. This vessel gives off a branch that turns outward. The upper nasal part of the flask is slightly narrowed and extended in a light red mass or convex band which widens little by little, and may be traced to the upper nasal part of the eyeball, where it seems to penetrate into the vitreous and become less and less distinct.

At $1\frac{1}{2}$ d.d. from the depression in the flask from which the vessel emerges, as above mentioned, the band presents a bluish white cord. It then divides into two branches, one contin-

uing in the original direction, the other turning obliquely inward and itself dividing into other branches, which lose themselves after a short course in a spot of choroiditis. The first branch may be followed a long distance toward the upper part of the vitreous to the limits of the ophthalmoscopic field.

The band-like mass shows on its temporal and nasal sides vessels which give off branches to the temporal and nasal portions of the retina, the last branch following the direction of the white bands. At the flask-like dilatation these vessels appear to sink into the mass and can be seen in it with difficulty.

About the place where one should find the papilla, and along the borders of the ribbon-like mass, exist foci of choroiditis with strongly pigmented spots. Other little foci are disseminated in the fundus of the eye. One of the vessels after leaving the band-like mass presents a perivascular pigmentation. The choroid in general is poor in pigment.

Examination of the crystalline lens also reveals anomalies (see Fig. 2). After maximum dilatation of the pupil one sees on the posterior surface in the upper nasal quadrant a white star resembling in appearance shreds of asbestos. From a central point go out numerous rays of unequal size, of which two longer ones are directed downward. Examined with the Czapski-Gullstrand microscope, the star pre-

sents a concavity forward and is clearly localized in the posterior crystalline. The anterior part of the vitreous contains numerous mobile filaments which have a point of attachment to the star described.

The right eye is normal and presents no lesion.

The ophthalmoscopic picture described above resembles much that published by Finnoff (A. J. O., v. 3, March, 1920), who stopped with the diagnosis of a congenital anomaly without being more specific. I think that our case and that of Finnoff are both cases of persistent hyaloid artery and canal of Cloquet. The white band-like mass constitutes what is called the canal of Cloquet and the bluish-white cord the hyaloid artery. The star in the posterior part of the lens is the anterior termination of the artery, from which little branches still float in the vitreous. The hyaloid artery is obliterated.

Eversbusch, von Reuss and Manz give as characters distinctive of the canal of Cloquet: The existence of an enlargement at the position of the papilla of a volume notably greater than that of the vessels, which resolves itself into membranes that have no connection with the crystalline. Our band-like mass presents well all these characters. According to the same authors the hyaloid artery should conform to the following conditions: Taking its origin on a central retinal vessel having a caliber approaching that of the retinal vessels, and being in relation with the posterior surface of the crystalline lens. Except the first condition, which is not visible because of the prepapillary flask-like dilatation, the two other characters exist with regard to the bluish-white cord. According to Prof. Van Duyse the visible canal of Cloquet should present at its posterior extremity a funnel-like dilatation or a vesicle known by the name of "hammer-like area". The free papillary flask of our case furnishes this last condition.

One of the characters claimed by Hirschberg, the lighter coloration of the side presenting the anomaly, is

lacking. The persistence of the canal of Cloquet is an anomaly not very frequent, and the interpretations to which it has given rise are sufficiently numerous.

By Eversbusch it is made a post-embryonic modification of the central lymphatic space of the vitreous or the remains of previous hemorrhages to which the eyes of myopes would be subject.

According to Bach and Hess the canal of Cloquet is formed from the sheath of the unabsorbed loose cellular tissue surrounding the hyaloid artery, in fact, a lymphatic sheath thru the persistent artery.

By Hirschberg, De Beck and Van Duyse it is regarded as the thickening of the connective tissue surrounding the hyaloid artery. It is also the opinion of Parsons that the canal of Cloquet is due to the persistence of the cellular sheath of mesodermic origin surrounding the artery and found in a space limited by a hyalin membrane.

By all these authors, therefore, the canal of Cloquet is regarded as of mesodermic origin.

The embryologic work of Wolfrum, Krückmann, Seefelder, Magitot and Mawas has thrown a new light on the origin of the canal of Cloquet. The hyaloid artery during its course in the optic nerve is surrounded also by a sheath of one layer of epithelial cells. In front of the level of the papilla these cells form a mass occupying the funnel formed by the bend of the nerve fibers. This cellular mass extends laterally on the papilla gradually thinning out.

In its course thru the vitreous the hyaloid artery is equally surrounded by a layer of epithelial cells taking its origin on the papilla from a large base corresponding to the periphery of the papillary mass. This sheath contracts in penetrating the vitreous and presents then the form of a funnel, the "hammer-like area." In proportion as the hyaloid artery penetrates the vitreous body this cellular sheath approaches the artery but never fuses with it. There exists between them a space traversed by fine protoplasmic

prolongations. The sheath accompanies the artery during a certain part of its course and seems to disappear at a certain level. Mawas and Magitot have, however, been able to recognize on all the branches of the hyaloid artery, however small, cells of the same character as the cells of the sheath. These extend as far as the endothelium of the vessels and are united to them by the ends of the protoplasmic processes. It is at the fifth month of intrauterine life that the sheath attains its maximum development, and begins to diminish in thickness, to disappear generally at the time of birth.

By appropriate staining Seefelder was able to demonstrate that this sheath is of ectodermic origin and by its histologic structure that it is a neurological tissue. The periarterial sheath in the nerve and in the vitreous and the epipapillary cellular mass are developed from the same tissue. All these observations of Seefelder have been completely confirmed by the work of Mawas and Magitot.

The persistence of this glial coat, its exaggerated development even to the anterior pole of the eye, and its failure to atrophy with increase of the space between it and the hyaloid artery offers a rational interpretation of the ophthalmoscopic image called persistence of the canal of Cloquet. This interpretation is essentially that of Vasseaux, Bach, Hess, De Beck, Van Duyse, Hirschberg and Parsons with this difference: that it is the persistence of hypertrophy of ectodermic tissue, while these authors last mentioned make it a mesodermic formation.

Our case seems interesting from other points of view: The abnormal situation, passing upward, of the artery and canal of Cloquet is exceptional. Hoorens has shown to the Belgian Ophthalmological Society a case in which the canal of Cloquet had a similar direction. It appears that a fetal retinitis localized at the upper inner side of the retina may produce an adhesion between the hyaloid artery and its sheath, on the one part, and the retina on the other part. As we

have pointed out in the description of the case there existed numerous foci of choroiditis, the larger of which were localized along the canal of Cloquet. The hypothesis of Van Duyse that the deviation is due to an old inflammatory exudate may be accepted.

The anterior termination of the artery on the crystalline lens is very interesting, for its distinctness. It recalls the star, the radiating figure given by Van Duyse in a case of termination of the artery upon the crystalline lens. The excentric position is evidently due to the same cause as the abnormal position of the artery. The division of the artery into three branches visible by ophthalmoscopic examination is equally exceptional. A final interesting detail is the abnormal course of the retinal vessels. Instead of expanding on the retina at the margin of the papilla they appear to have been carried away by the glial coat of the hyaloid artery. Two vessels seem to follow the normal course, and one has been able to pass thru the prepapillary flask and return to its proper direction. The others follow the direction of the canal of Cloquet and are situated at first in the deep layers afterwards reaching the surface. The lateral branches which they give off bend at right angles to reach immediately the retina. To what is this abnormal direction due? Is it not hypertrophy of the neurologia which has mechanically prevented the vessels from following the normal path in the course of their development? The cases of Finnoff and that of Kipp present a similar vascular distribution.

EPIPAPILLARY MEMBRANE

CASE 2. D. Gerard, aged 23 years, presents in the left eye a typical coloboma of the iris. The refraction is hyperopic 1 D. The vision is normal and there exists no lesion of the deep membranes of the media.

The right eye is hyperopic 1 D., and has vision equal 0.4. The optic disc is red, and the vessels not visible upon it. At the center there is a small white mass from which proceed several white thread-like prolongations; two go up

and to the nasal side and two downward. These filiform prolongations terminate on the retinal arteries in slender points. The disc appears to be covered with a thin nontransparent veil (see Fig. 3, Plate 5). Examination with the large binocular ophthalmoscope of Gullstrand gives clearly the impression of a thin opaque veil covering the papilla which is thicker at the position of the thread-like prolongations.

ABNORMAL EXTENSION OF THE LAMINA CRIOSA

CASE 3. Van M. René, 25 years old, was hyperopic 3 D. in the right eye with vision 0.5 after correction. The ocular media are normal. On ophthalmoscopic examination one finds on the disc between the center and the nasal margin, in the horizontal diameter, a brilliant white mass directed upward and outward and partly covering the disc; and forming a bridge over the upper nasal vein a little in front of its entrance thru the lamina cribrosa. After having covered that vein the mass spreads out in a fan covering all the upper quadrant and passing over the superior temporal artery and vein to about the same distance as along the superior nasal vein. Another bifid prolongation is directed to the temporal side. This mass presents no striation. (See Fig. 4, Plate 5).

The left eye is astigmatic, hyperopic and amblyopic, but without lesions of the deep coats.

COMMENT

Case 2 corresponds in its ophthalmoscopic appearances to the picture of epipapillary membrane, and Case 3 to that known under the name of abnormal extension of the lamina cribrosa of Masselon. The origin of these membranes and extensions has been strongly discussed. Masselon agrees that it was Fuchs who first described a case in which the middle part of the disc was covered by a brilliant white spot, which only feebly permitted the perception of the underlying vessels. A spot formed by a thin veil of uncolored

tissue probably connective tissue. Randall has reported several cases but without an explanation of their origin.

According to Masselon these structures are of connective tissue origin. They may proceed from the central connective tissue strand of the lamina cribrosa, or the fibrous tissue of the sclerotic; or the connective tissue fibres of the choroid.

This is the reason he has given to this anomaly the name of abnormal extension of the lamina cribrosa.

Berger considers these formations as results of a neuroretinitis which has run its course during intrauterine life.

According to Eversbusch they arise from an excessive development of the papilla with thickening of the adjacent part of the limiting membrane following inflammation during fetal life.

Wintersteiner assumes that the retina has presented folds which are not effaced and which change into connective tissue.

Most authors, however, think that the appearance under discussion is that of embryonic remains. Bauer, Hirschberg, von Szily, Mayeda, Vossius, Parsons, Van Duyse, De Beck, Reuss, consider these extensions or veils as remains of the hyaloid vessels, and the connective tissue membranes which ensheathe them.

According to Oeller they are the remains of the sheaths of hyaloid vessels in the nature of neuroglia.

We come to see apropos of the persistence of the canal of Cloquet that the funnel of nerve fibres at the level of the optic disc is occupied during fetal life by a mass of neuroglia cells, that this mass spreads out over the whole nerve head and that the margins thin out while the other part of the hyaloid artery is covered with a sheath of neuroglia in the shape of a funnel, the base of which covers the disc while its extremity gradually approaches the artery.

It is the persistence of this funnel which seems to me the best explanation of Case 1, the persistence of the hammer-like part of the canal of Cloquet.

As the retinal vessels emerge from the epipapillary mass it is not strange that they are completely covered, following the nonabsorption of the mass and of the neuroglia funnel.

The filiform prolongations are probably part of the thickening of the neuroglia tissue at the place of the vessels. In the third case on the contrary only a part of the epipapillary

neuroglia is absorbed, while the remainder is retained.

We conclude that the canal of Cloquet, epipapillary membrane and extensions of the lamina cribrosa are essentially identical congenital malformations, all three dependent on a hyperplasia and a nonabsorption or incomplete absorption of the hyaloid neuroglia tissue.

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PROLONGED MONOCULAR OCCLUSION AS A TEST FOR THE MUSCLE BALANCE

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This paper describes the method of occlusion and emphasizes the need for making it complete and prolonged. It reports graphically striking results in the unmasking of heterophoria not discovered by other methods. Read before the American Ophthalmological Society, June, 1920.

The method to which the title of this paper refers is an extension in point of time only of the screen or cover test. It has been put in practice by replacing one of the patient's lenses by a ground glass, it being found necessary occasionally, on account of the annoying glare from the latter, to paste a piece of dark paper over the back of it, or to substitute a black patch for it. The ground glass is used on account of its comparative inconspicuousness, but a black patch is much less annoying to wear. A full refractive correction is worn over the other eye.

The object of the test is explained in detail to the patient, and it is scarcely necessary to state that only those who combine sufficient intelligence to understand it with a realization that the problems presented by their cases are obscure, and a genuine desire to give all possible assistance in solving them are fit subjects for it. As a matter of fact patients of this class are very numerous. I have been surprised at the willingness, even eagerness, with which it has been accepted by patients, and at the conscientiousness with which it has been almost invariably carried out.

The directions given to the patient are that he shall put the glasses on in the morning before opening his eyes, that he shall not look over or under them, that if he wishes to remove them for any purpose during the day he shall close his eyes, or at least one of them before doing so, and replace the glasses before reopening them, and that he shall wear them until after he has closed his eyes at night. In other words, that one eye shall not be allowed to associate with the other during the whole period of the test. Strict continuity is apparently a very impor-

tant detail. It was my good fortune to come across a case previously in the hands of one of my colleagues, in which sufficient emphasis had not been laid upon this point.

Thru his courtesy I am able to give the results of a seven and also a fourteen-day occlusion test in which the patient did not put his glasses on until after dressing.

Before the first occlusion test examination showed an exophoria of one-half degree and no hyperphoria.

After the seven-day test the exophoria rose to one and one-half degrees, and there was a left hyperphoria of one and one-quarter degrees.

After the fourteen-day test the exophoria was two degrees, and the hyperphoria three degrees.

A ten-day test without any break in the continuity gave exophoria seven degrees, and L. hyperphoria three degrees.

At the end of the period of occlusion, or whenever a test of the muscle balance is made during it, a full correction of the refraction is placed in a trial frame, with a Maddox rod or whatever other means is selected for the test, the patient is directed to close his eyes, his glasses are removed and replaced by the trial frame. He is then directed to open his eyes, and the test is made, without any break in the continuity of occlusion. It is my usual practice to use the Maddox rod for the vertical, and the phorometer or vertical diplopia test for the lateral deviations, with the screen or parallax test as confirmatory. The difference between these tests is not always in favor of the screen test, and is negligible compared with the changes occurring under prolonged occlusion.

The choice of the eye to be covered is usually determined by finding out

which eye the patient uses for pointing or aiming at a distant object, and occluding the other, or if one eye is defective, by occluding that.

I have used this method occasionally for about twenty-five years, with increasing frequency during the last ten or twelve years and have notes of about five hundred cases.

In the earlier cases the observations were limited to the changes in the position of rest for 6 meters, but in some of the later ones have been extended also to the abduction, near point of convergence, and the balance at 1/3 meter before and after occlusion, and also to the distribution of the hyperphoria over the field, chiefly after occlusion.

In the majority of cases the muscle balance has been determined at the beginning and end of the period of occlusion only; but in a number, daily observations have been made for the purpose of getting information as to how long it takes for the muscles to relax, and to arrive at stability. Some of the cases seem to suggest that this happens within a week, but repetition of the test in others shows that a week's occlusion may leave a good deal of error latent. A study of the charts to be shown will leave but little doubt that a period of several days at least is necessary to bring about a sufficient relaxation of the muscles.

In most cases the period of occlusion has been for seven days. It should be stated that this method has been used only in those cases in which the correction of the refraction, and such faults in the muscle balance as can be detected by the ordinary methods, has failed to relieve the symptoms or has aggravated them.

The cases may be divided roughly into the following groups on the basis of the results obtained:

1. Those in which no change occurs in the relative position of rest.
2. Those in which an error is found that was not demonstrable before occlusion.
3. Those in which the error found before is increased to a greater or less extent after occlusion.

4. Those in which there is a reversal in the form of deviation, right changing to left hyperphoria, or esophoria to exophoria.

5. Those in which there is a reduction in the amount of error.

What changes take place in exophoria are in the direction of increase. In the majority of cases the near point of convergence is normal before, and remains normal after occlusion.

Esophoria sometimes diminishes or even changes to exophoria, and sometimes increases.

In hyperphoria the changes may be in the direction of increase, decrease, or reversal. When reversal takes place, it is usually accompanied by the development of exophoria.

The youngest patient in whom the test was made, showing a latent error, was eleven years old, and the oldest seventy-eight. In another case there seems little doubt that the error was present at five years of age and causing symptoms, tho the test was not made until nine years later.

I present a series of 73 charts, ten of which are herewith reproduced, showing at a glance the main changes which have taken place in the cases they represent.

The chief conclusions suggested by the observations made by this method is that the period of time for which the binocular function is usually annulled during tests for the muscle balance is too short to permit the desired relaxation of the muscles to take place. The length of time necessary to bring out the error seems to vary in different cases; but it is evident that in many a seven-day period is enough to furnish valuable information.

In the second place it is evident that the tests as ordinarily used may not only fail to show how much error is present, but may also be misleading as to its character.

Third, that the paralytic or nonparalytic nature of a hyperphoria becomes much more apparent after the test than before, a very large majority being of the former character. In many cases, even in those in which there is a normal equilibrium in the primary posi-

tion, evidence is found in the oblique positions of insufficiency of one, and somewhat commonly of both inferior recti, and the same applies, perhaps less frequently, to the other muscles.

Fourth, that there is no constant relation between the prism duction and the muscle imbalance, at any rate so far as abduction and exophoria are concerned; as the latter after occlusions frequently exceeds, sometimes very greatly, the abduction as measured before occlusion.

Fifth, that the opinion that the constant wearing of prisms tends to increase a deviation receives no support from these observations, far more rapid and extensive changes being brought about by prolonged annulment of the binocular function.

Sixth, that the frequent failure to relieve symptoms by the constant wearing of prisms is explained in part by the fact that the total error may greatly exceed the manifest, and that such prisms as can be worn offset too small a fraction of the total error to make any appreciable difference.

Seventh, a few observations seem to indicate that the effect of prism exercises is to obscure or render latent an error previously manifest, this error being easily brought out again by an occlusion test.

Eighth, that the effect of a tenotomy cannot be measured without an occlusion test both before and after operation.

EXPLANATION OF CHARTS

X indicates a lateral deviation; above the zero line, exophoria; below, esophoria.

O indicates a vertical deviation; right hyperphoria above; left below the line.

X O on zero line, orthophoria.

P P C, punctum proximum of convergence, measured from base line.

Occ. Occlusion.

Hyp. Hyperphoria.

In the measurement of abduction the higher number indicates the point at which diplopia occurs, the lower the point at which fusion returns.

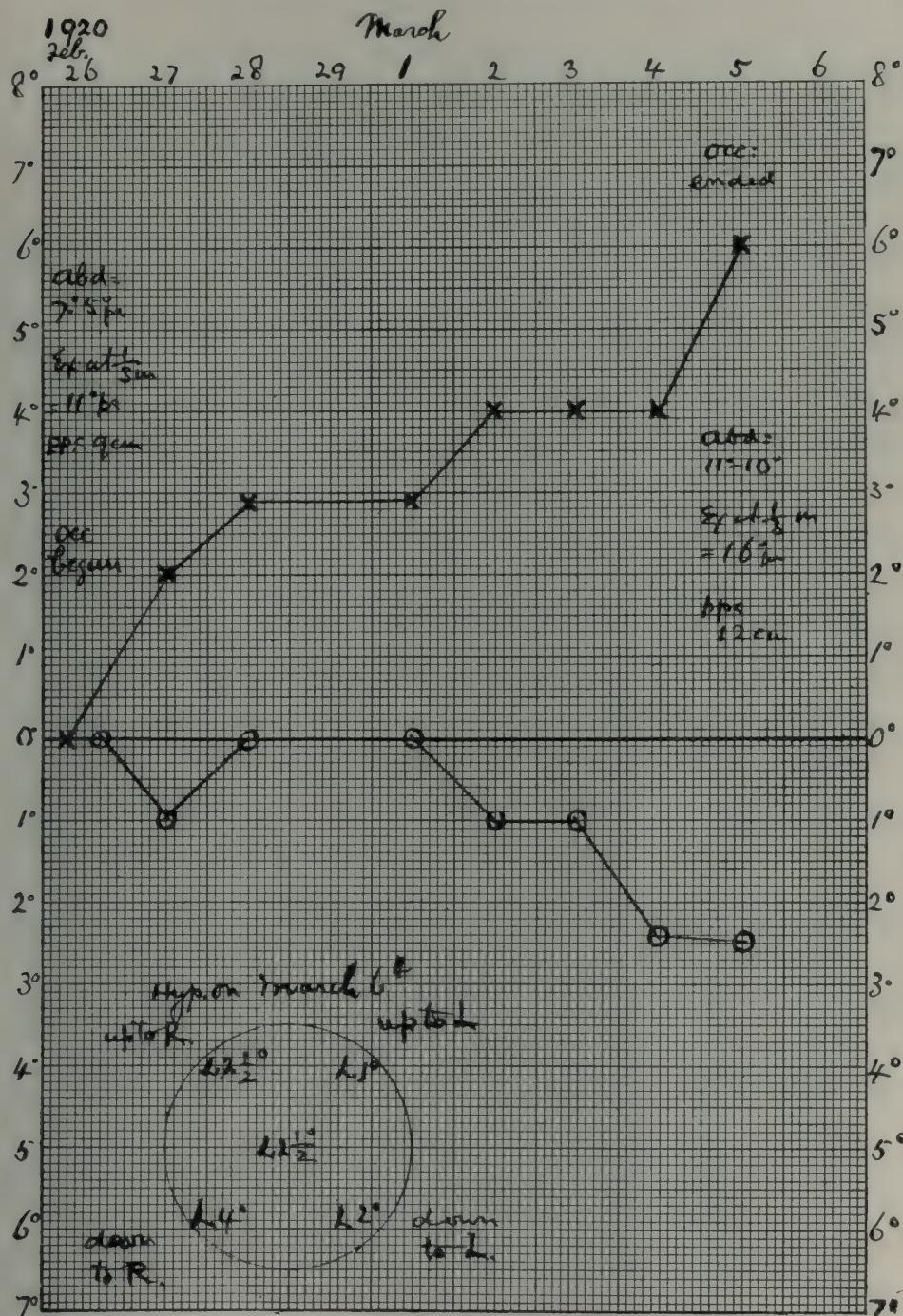


Fig. 1, Case 1. Mr. H. J. H., aged 33. Asthenopia, photophobia, constant sense of strain. Has consulted eight oculists without benefit.

Wearing: Right + 1. sph. + 1.25 cyl. axis 95°; left + 1. sph. + 1.00 cyl. axis 75°.
Accepts under scopolamin: Right + 1. sph. + 1.37 cyl. axis 100°; left + 1. sph. + 1.25 cyl. axis 67.5°. Obtained great relief by prism correction.

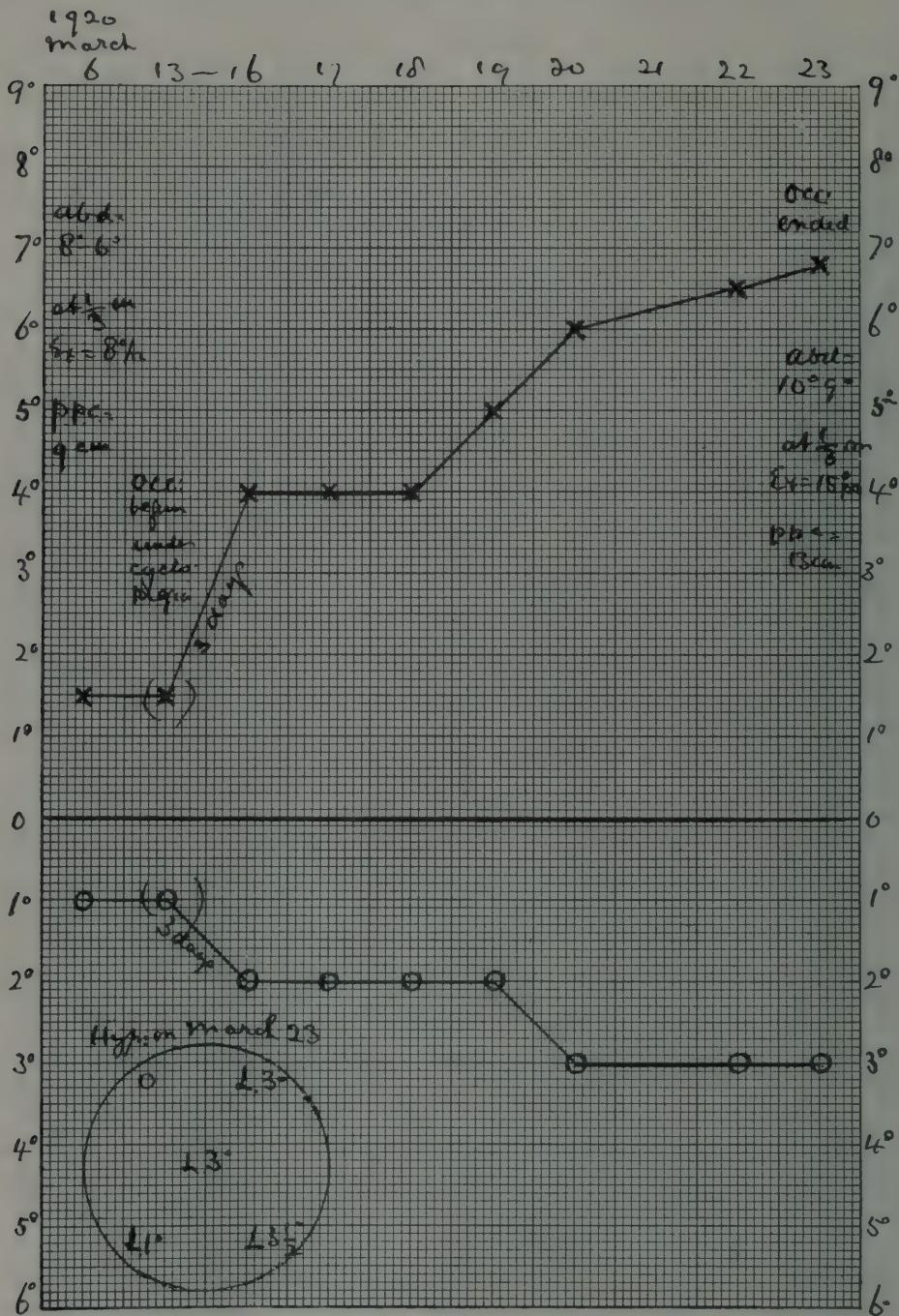


Fig. 2, Case 2. Harold R., aged 19. (8205). Severe asthenopia and headache. Two previous occlusion tests in which he did not put on his glasses until after dressing. Primary test showed exophoria $\frac{1}{2}^{\circ}$, Hyperphoria 0°. First occlusion test of seven days showed Exophoria $1\frac{1}{2}^{\circ}$, L. Hyperphoria $1\frac{1}{4}^{\circ}$. Second occlusion test of fourteen days showed Exophoria 2° , L. Hyperphoria $1\frac{1}{4}^{\circ}$. Third occlusion test of ten days without break showed Exophoria $6\frac{3}{4}^{\circ}$, L. Hyperphoria 3° .

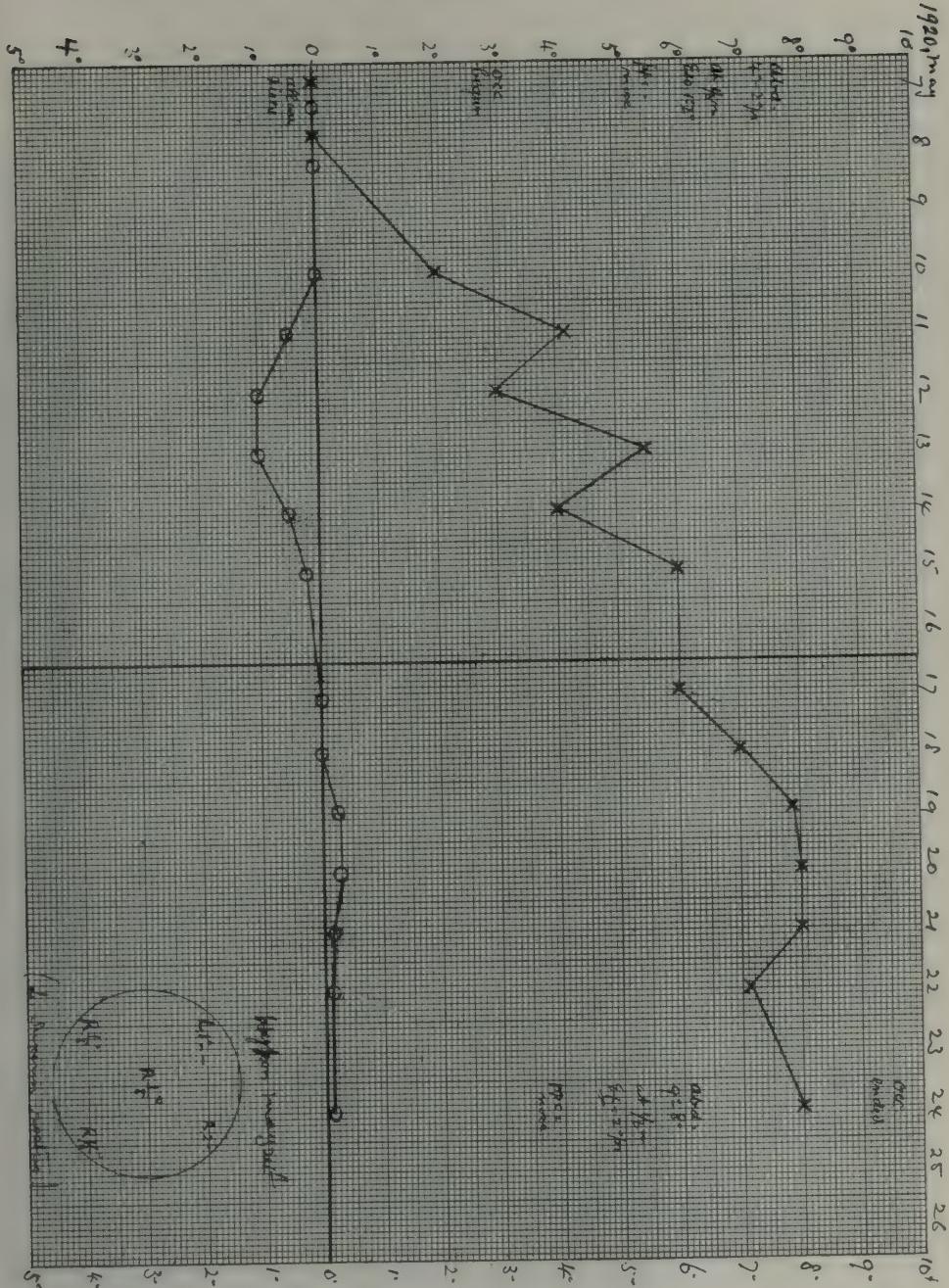


Fig. 3, Case 3. (52.24). Mr. S. R. M., 44.

Headaches and nervousness.

When first seen in 1901 showed Esophoria 3° , and R. Hyperphoria $\frac{1}{2}^{\circ}$.Refraction 1919: Right $+1. + 0.12$ cyl. axis 150° ; left $+1. + 0.12$ cyl. axis 55° .Note that occlusion of twenty-four hours produced no change in muscle balance that it took three days to bring out 2° of Exophoria, and twelve days to arrive at stability. Also that the final Exophoria is at least double the primary abduction.

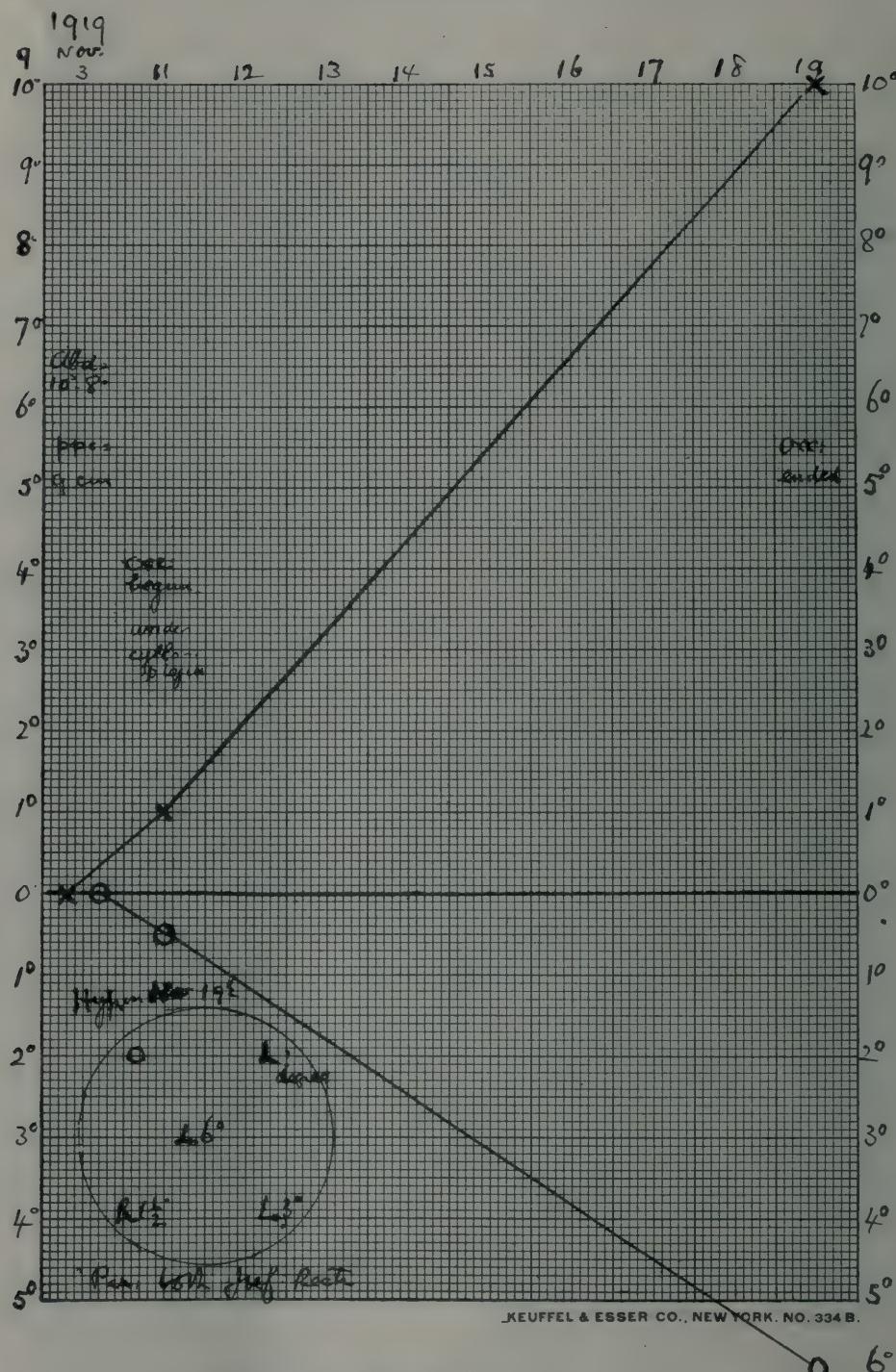


Fig. 4, Case 4. Mrs. T. E. M., 32. (1900)

Congestion of L. eye and L. sided headache one year or more. More or less trouble with eyes all her life. Photophobia, flatulence, nausea, insomnia.

Refraction under scopolamin: Right — 0.12 sph. + 0.37 cyl. axis 100°; left + 0.25 sph. + 0.25 cyl. axis 90°. December 16. No headache or asthenopia and less nervous.

Note distribution of Hyperphoria at end of test, indicating paresis of both inferior recti.

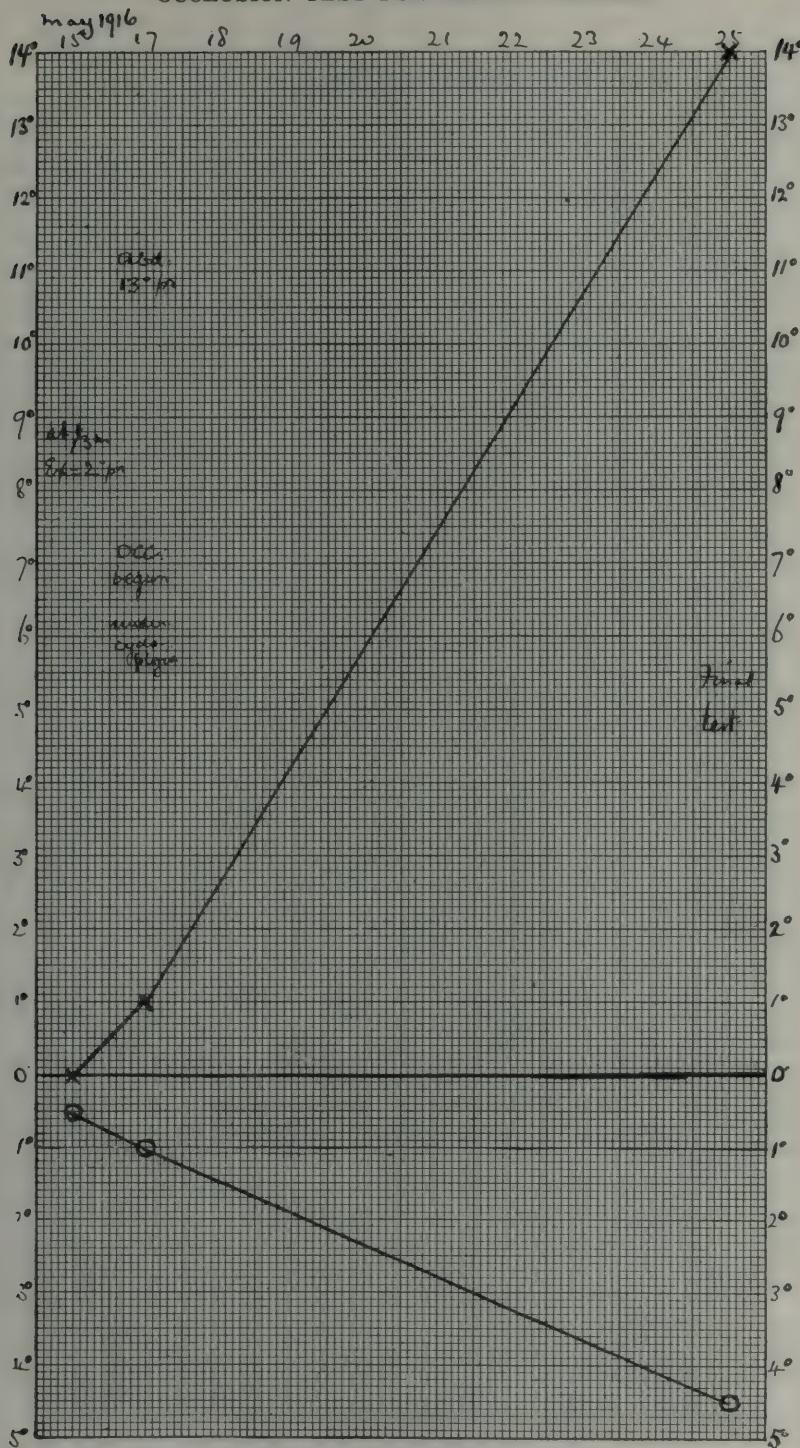
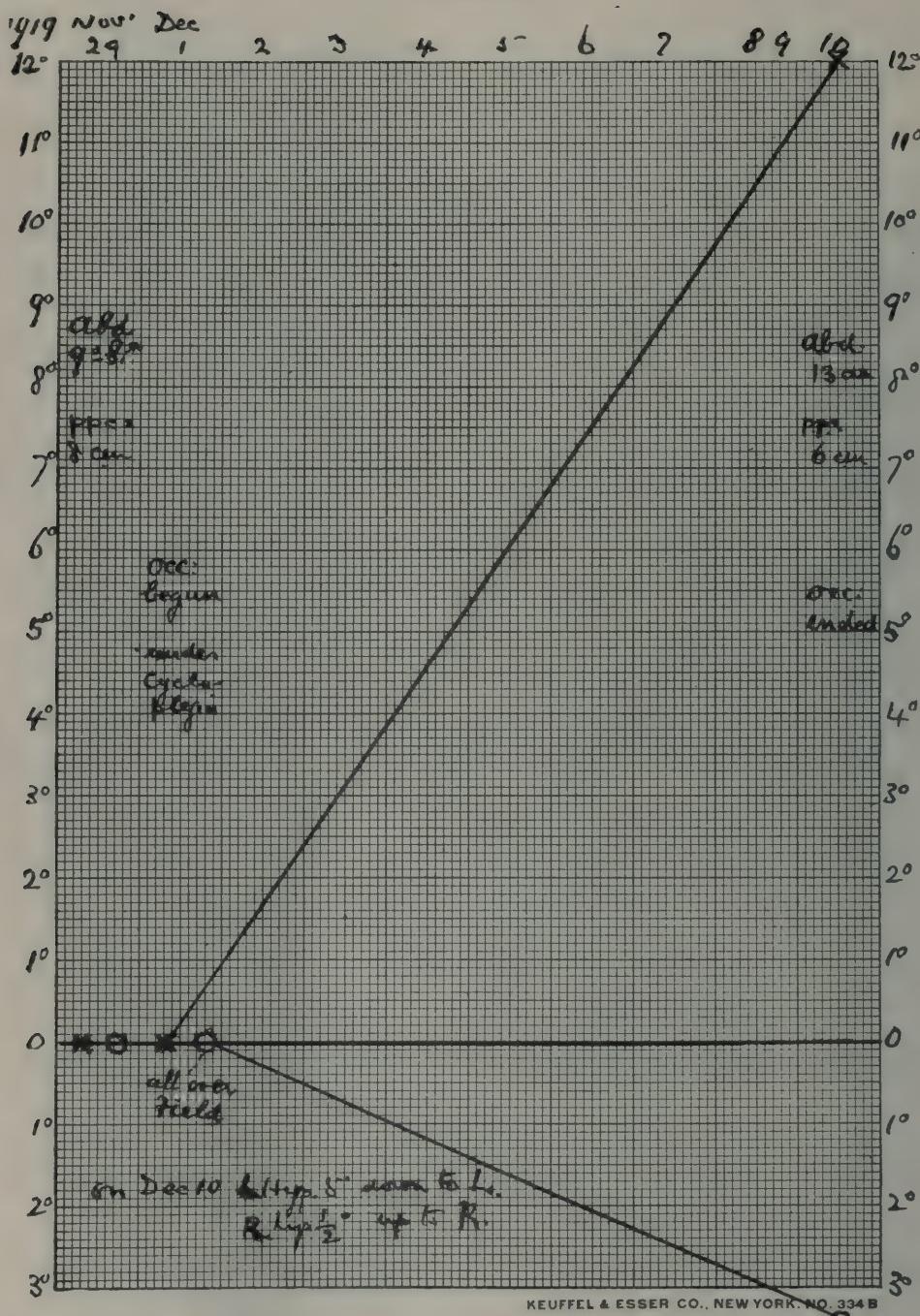


Fig. 5, Case 5. Mrs. C. A. T. (4737).

Always subject to sick headache once in six weeks, requiring hypodermics. Constant headache in the intervals. Asthenopia, photophobia. Examined many times and operated on in Pittsburgh in 1898, without benefit. Now glasses for several years. Under cycloplegia: Right Em; left 0.50 sph. She had Esophoria 7° , and L. Hyperphoria $1\frac{1}{2}^{\circ}$, and a partial tenotomy on the left inferior rectus and free tenotomy of left inferior rectus. To illustrate unknown effect of tenotomy without occlusion test.



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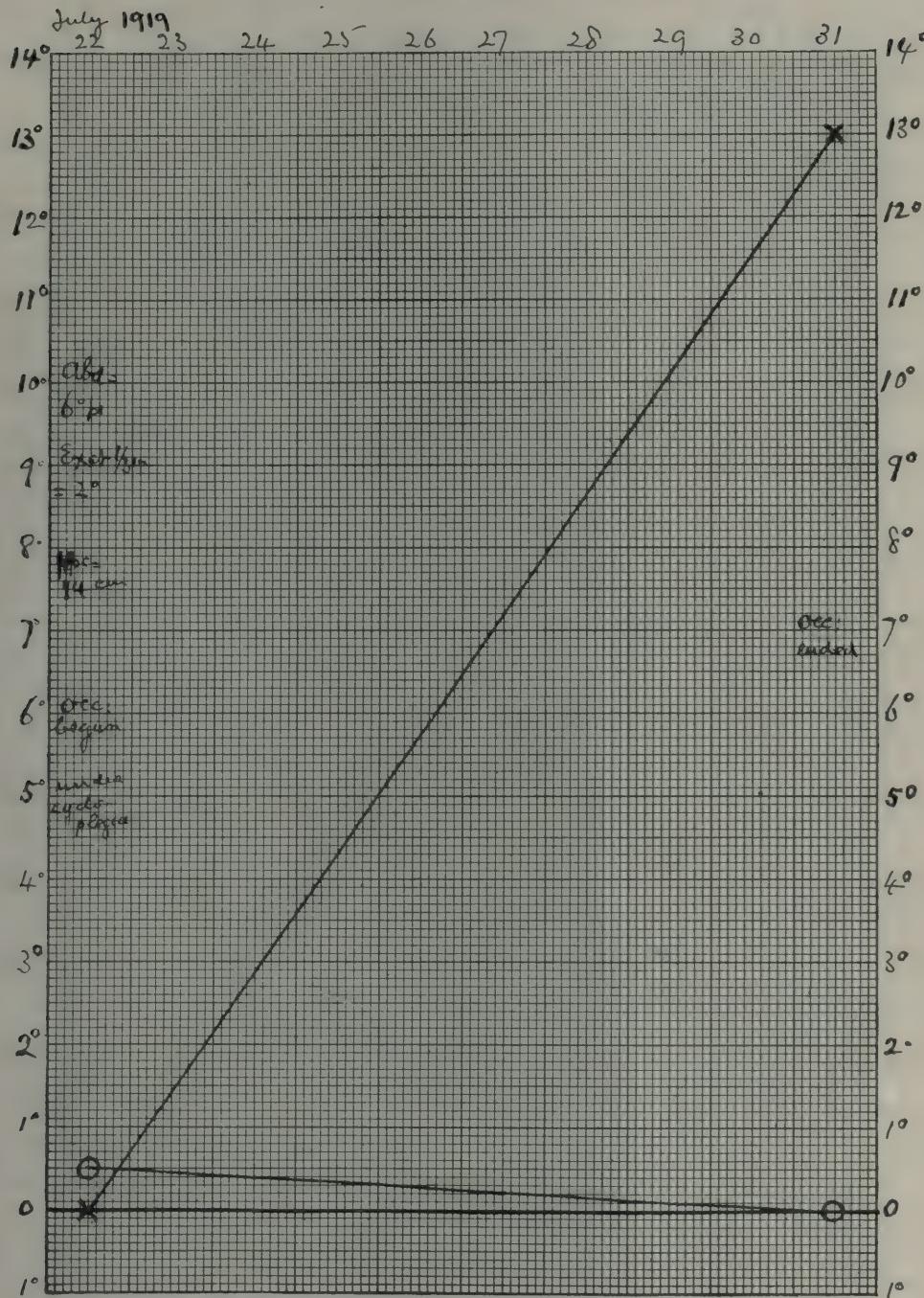


Fig. 7, Case 7. Mrs. C. R. S. (7663).

Operated on for goiter seven months ago, for tonsils six weeks ago, on account of nervousness without much improvement in symptoms. Cannot do anything in the morning. Severe asthenopia, strained feeling, chiefly looking off. Photophobia, almost constant vertigo.

Refraction under scopolamin: Right — 0.25 sph. + 0.62 cyl. axis 80°; left — 0.25 sph. + 0.62 cyl. axis 110°. Given full refractive correction and 3 base in each eye.

September 26. Reports symptoms all gone. "Reads regardless"; no vertigo.

Final Exophoria more than double primary abduction. Disappearance of Hyperphoria.

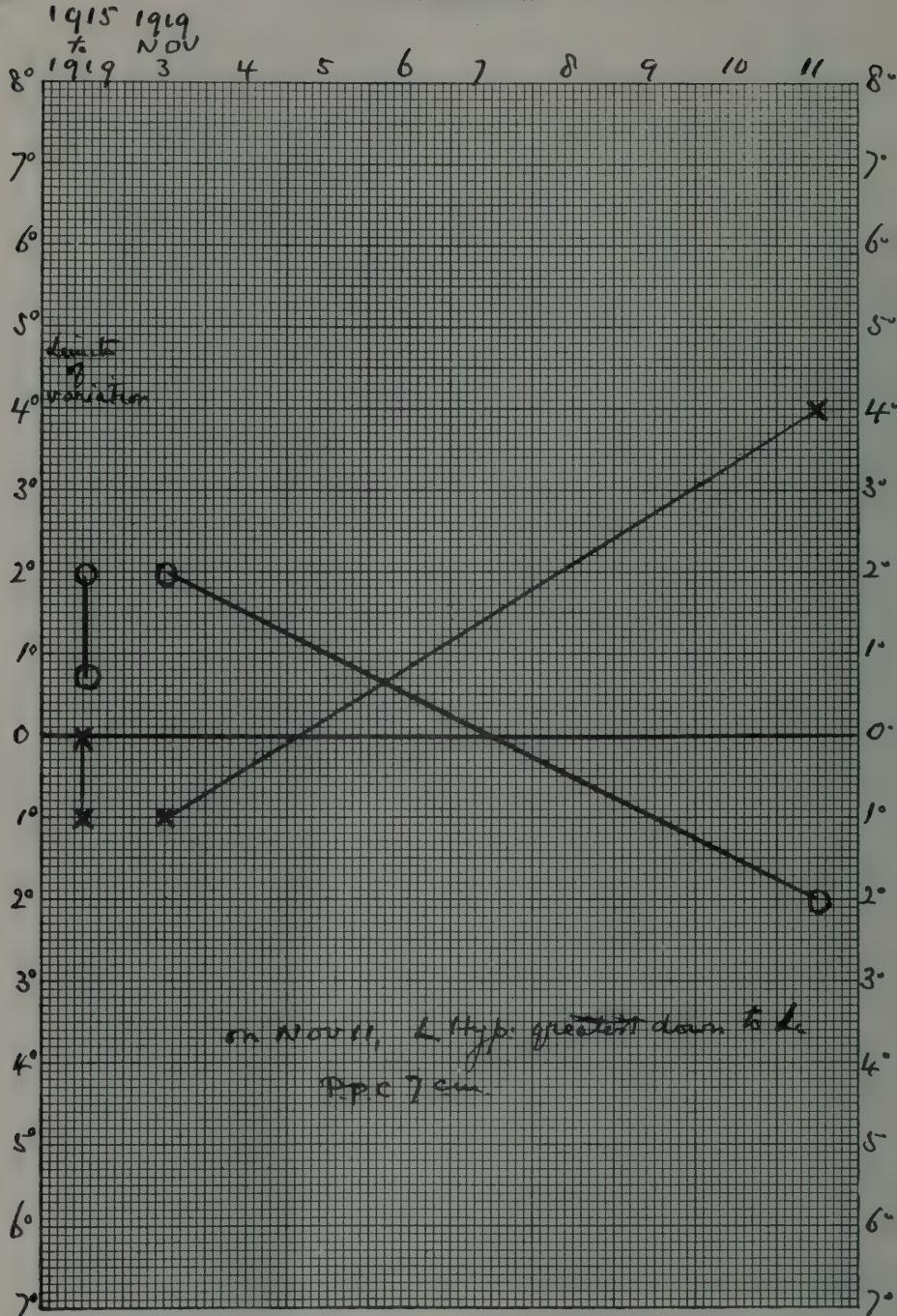


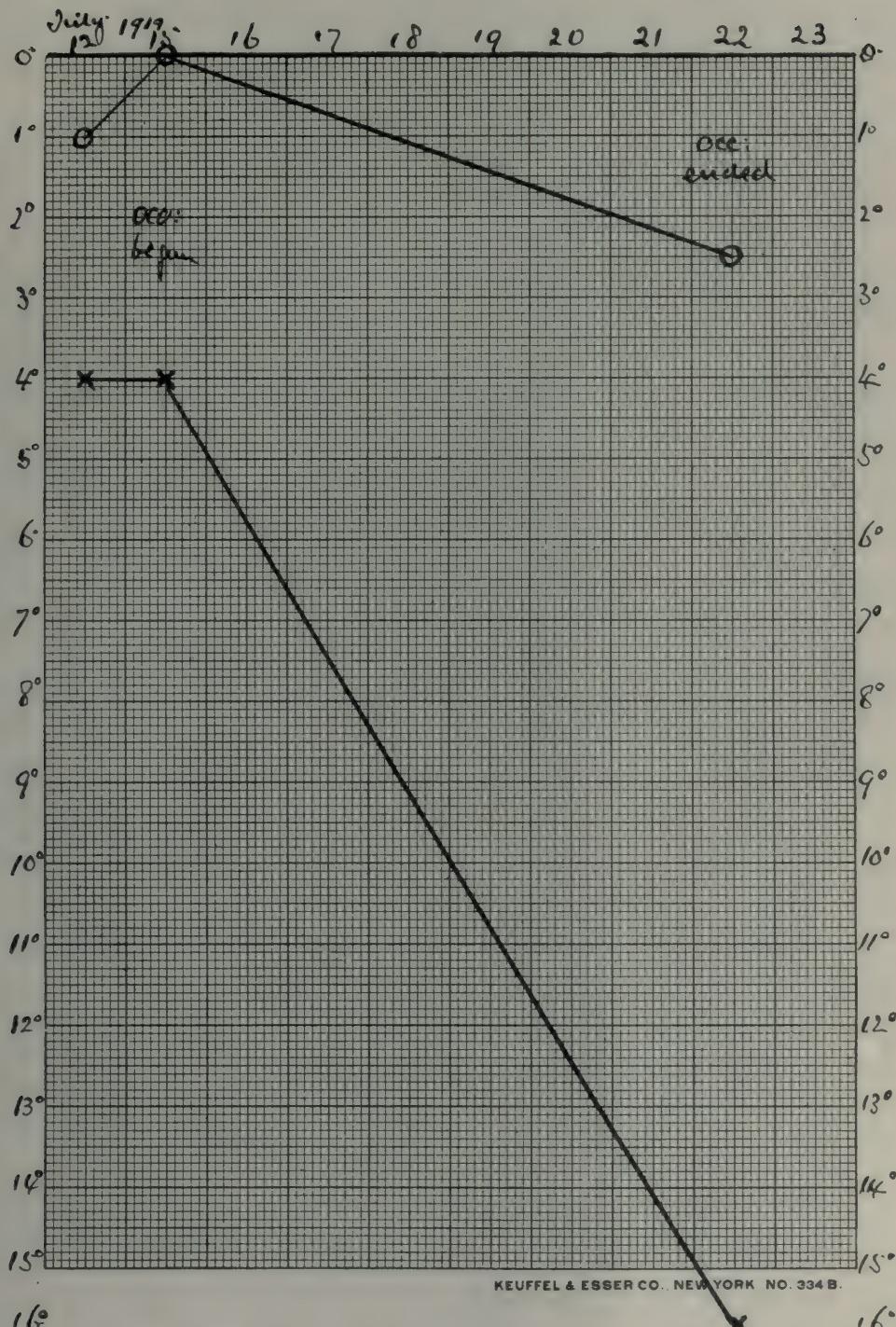
Fig. 8, Case 8. Miss D. S., 20. (4162).

September, 1915. Glasses cause lacrimation. Headaches, temporarily relieved by correction of refraction and R. Hyperphoria, but finally increasing in number. No headache while ground glass was worn (November, 1919).

March 9, 1920. "The glasses have almost entirely relieved my headaches." One or two a month now instead of several a week as before.

Refraction under scopolamin: Right + 0.25 sph. + 0.12 cyl. axis 70°; left + 0.25 sph. + 0.50 cyl. axis 90°.

Note that for over four years muscle tests always showed from $\frac{3}{4}^{\circ}$ to 2° of R. Hyperphoria, and from no lateral error to Esophoria 1° .



16°

Fig. 9, Case 9. Prof. T. W. D., 35.

Use of eyes makes him nervous all over. Glasses (practically an accurate refraction) strain eyes. Photophobia. Would have to give up work if relief could not be obtained.

A second occlusion test after partial tenotomy of each internus showed Esophoria 9° and L. Hyperphoria 1°. A second tenotomy of L. internus, L. Esophoria 4° and Hyperphoria 0°. Operations gave great relief.

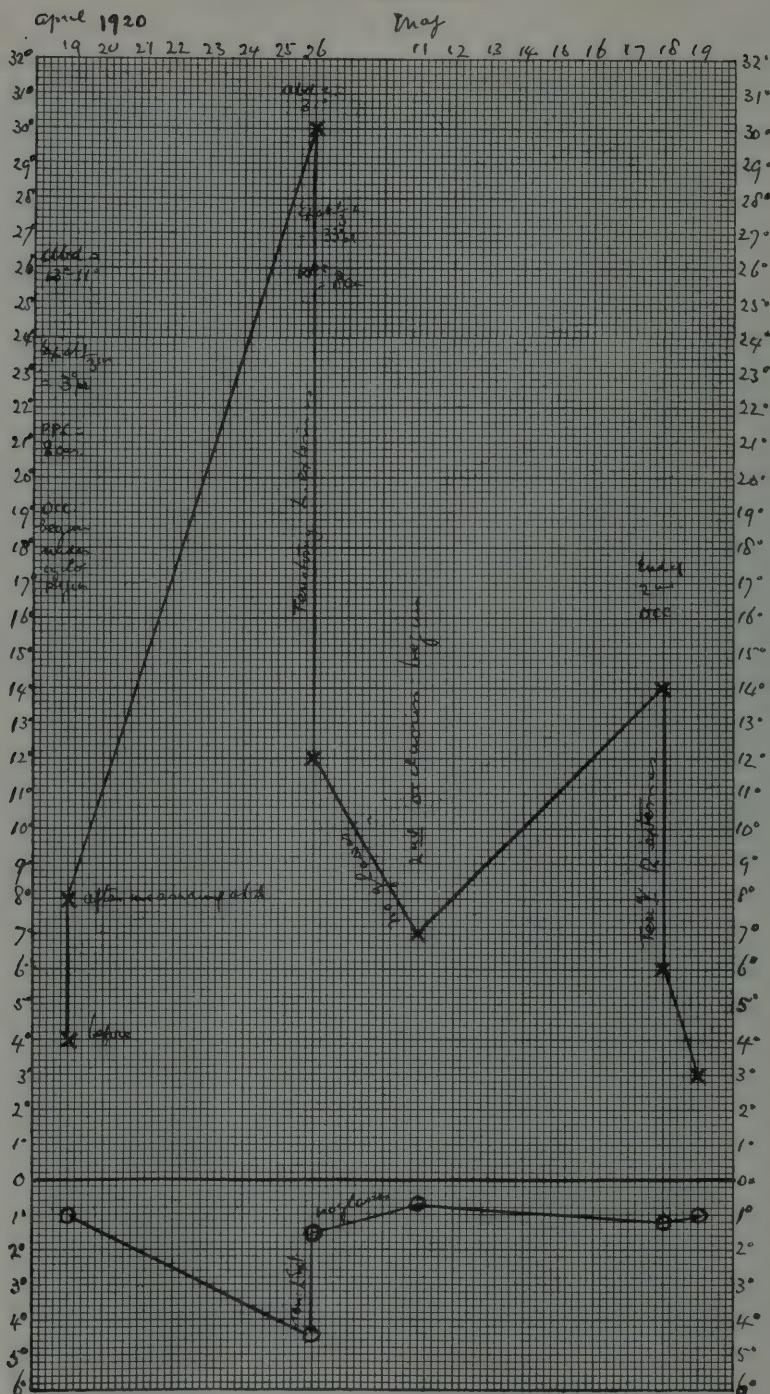


Fig. 10, Case 10. (8312).

Fig. 16, Case 10. (6312).
Miss M. N., 22, obliged to give up teaching on account of "nerves." Headache, stomach trouble, insomnia and some asthenopia.

Refraction under scopolamin: Right + 0.25 sph. + 0.25 cyl. axis 60°; left + 0.12 sph. + 0.12 cyl. axis 135°.

Note diminution of Hyperphoria after lateral tenotomy.

Note diminution of hyperphoria after lateral tenotomy. After first occlusion test L. Hyperphoria was 7°, down to L. 0° up to right.

On June 7th L. Hyperphoria was $\frac{1}{2}^{\circ}$, down to $L. 0$ up to right.
After first occlusion test L. Hyperphoria was $\frac{1}{2}^{\circ}$ in primary position, and $\frac{1}{2}^{\circ}$ — in all oblique positions.

Patient was greatly benefited by operations.

CARCINOMA OF THE ORBIT WITH THE REPORT OF A CASE

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This paper discusses carcinoma of the orbit and reports a case apparently not connected with the normal epithelial structures of that region. A bibliography of such cases and one of recent cases of metastatic carcinoma of the choroid is appended. Candidate's Thesis submitted to the American Ophthalmological Society.

Many varieties of both benign and malignant tumors have been found in the orbit, and the occurrence of this condition is comparatively common. It is difficult, and usually impossible, to determine the variety of orbital tumor by clinical signs. Malignant neoplasms grow more rapidly than the benign, but the rate of growth is not a certain index of the variety of malignant tumor; and in the absence of signs of malignancy in the body, the only means of determining the nature of an orbital growth is by the microscopic examination of sections taken from it. If malignant neoplasms are present in other portions of the body, and a tumor of the orbit develops, the possibility of the orbital tumor being metastatic should be considered.

The occurrence of a carcinoma deep in the orbit, without involvement of the globe, the lacrimal gland or the skin, is very rare. The presence of metastatic carcinoma in the choroid is much more common than in the orbit. The reason is probably because of the greater choroidal vascularity.

Since Pearl's¹ first description of metastatic carcinoma of the choroid in 1872 many cases have been reported in the literature. Oatman,² in 1903, collected thirty positive and four doubtful cases from the literature. Grosvenor³ gathered twenty additional cases which had been reported between the years 1903 and 1908, and Shumway⁴ found four more in 1909; which totaled sixty-eight cases. Extension thru the globe into the orbit occurred in thirteen of the sixty-eight cases. With a few exceptions the orbital growths were small, and did not interfere with movements of the eyeball. Since Shumway's report in 1909, sixteen additional cases, which brings the total to eighty-four, have been reported.

(See bibliography). There was a record of extension thru the globe in Oatman's and in one of Ishihara's cases. In both of these cases the orbital growth was small and adherent to the eyeball.

The primary carcinomata from which the choroid was secondarily attacked were located in the great majority of instances in the breast, but the lung, stomach, suprarenal body, and uterus were also primary seats.

Only seventeen cases of carcinoma of the orbit, without involvement of the globe, lacrimal gland or skin of the face have been reported in the literature. In several of the reported cases of metastatic carcinoma of the orbit, the first symptom was a paralysis of one or more ocular muscles. Horner's⁵ case was in a man aged 65 years, who developed ptosis which was followed four months later by paralysis of all of the recti muscles. No nodules were felt in the orbit, but a growth was noted on the thyroid and submaxillary region. The man died six months after he was first seen. The post mortem revealed a carcinoma of the dura over the base of the sphenoid bone; extending from the optic nerve at its entrance into the foramen backward and downward to the base of the brain. In the orbit nodules were found in the recti and levator palpebrae muscles. The thyroid gland, sternocleidomastoid muscle, abdominal viscera, right pleura costalis, pericardium, peritoneum, and suprarenals were invaded by the carcinoma. Horner believed that the paralysis of the ocular muscles was due to pressure on the nerve rather than to involvement of the muscles by the carcinoma.

Elschnig's⁶ case was a woman of 73 years, who had a carcinoma of the cervix with metastasis in the mamma. All

of the eye muscles excepting the inferior oblique were invaded by the growth.

A woman 58 years of age was seen by Wintersteiner⁷. She had a carcinoma of the left breast and the neighboring lymph glands were involved. The first eye symptom to develop was a paralysis of the right internal rectus muscle. The patient died and post mortem examination revealed metastases in the liver, retroperitoneal glands and all of the ocular muscles of the right eye, excepting the inferior oblique.

In Axenfeld's⁸ case the woman developed a paralysis of the ocular muscles of the left eye, which was thought to be of toxic origin. Later exophthalmos developed and the tumor was found to be a metastasis from a carcinomatous mammary gland which had been removed two years previous to the eye symptoms.

Kipp⁹ saw a woman aged 58 years who developed ptosis of the left eye, which was followed by great impairment of motion of the eye in all directions. Seven months later a slight exophthalmos was noted. The breast had been removed for cancer. The patient died but an autopsy was not obtained. Kipp believed that from the symptoms a diagnosis of carcinoma was correct.

Shumway⁴ saw a woman aged 49 years. Her vision had been failing in the right eye for five months. When first seen there was limitation of motion of the right eye in all directions. A corneal ulcer developed and the anterior chamber filled with yellowish white exudate. The eye was enucleated and the vitreous was found to be clear, and no evidences of metastatic carcinoma were found in the choroid. Later a scirrhouss carcinoma was removed from the orbit. The breast and axillary lymph glands were the seat of a carcinomatous tumor. The patient died of intestinal obstruction; and the spleen, liver, kidneys, uterus, ovaries, broad ligament, the two abdominal recti muscles, and the pelvic wall were found to be invaded by the carcinoma.

In Birch-Hirschfeld's¹⁰ case, a carcinoma of the orbit was found in a woman 35 years of age. Recurrence followed exenteration of the orbit and the use of radium. The tumor originated in the hypophysis and extended into the orbit, and several small nodules were found in the choroidal vessels.

Reese¹¹ removed a tumor from the orbit, which proved to be a carcinoma when sections of the growth were examined under the microscope. The patient refused farther treatment and disappeared. The presence or absence of a demonstrable primary focus is not mentioned.

Combaud,¹² in a review of his cases of malignant tumors of the orbit, found that he had seen five cases of metastatic carcinoma in this location. Most of them were secondary to carcinoma of the breast.

Knapp's¹³ case had all the symptoms of a tumor in the posterior portion of the orbit. The patient was a woman 31 years of age. After operation the tumor was found to be a carcinoma. The tumor mass extended to the apex of the orbit and invaded the ethmoid cells. Ten and one-half months after the operation the patient died from extension of the tumor to the brain. No mention was made of carcinoma involving other organs of the body. The author believed that it had originated from a mass of tissue which probably had been separated from the lacrimal gland during its development.

Genet's¹⁴ case had exophthalmos for nineteen months. The carcinoma of the orbit was secondary to a carcinoma of the breast.

Ramsay¹⁵ removed a carcinoma from the orbit of a man aged 75. There was recurrence in three or four months. Death occurred ten months after the operation. There was no mention of a primary growth.

In Dombroski's¹⁶ case the orbital tumor was apparently an extension from a primary carcinoma of the sphenoid sinus.

There have been a number of cases of carcinoma and epithelioma of the orbit reported in the literature, which

were direct extensions from well defined primary malignant growths in the lacrimal glands, the lids or the skin, and presented no difficulty in diagnosis. It is the obscure orbital tumors, with no direct connection with demonstrable neoplasms that are here considered.

The occurrence of a new growth in the orbit, in the absence of a history of malignant neoplasms elsewhere in the body, leads one to believe that he is dealing with a primary tumor in this location. If the tumor is thought to be deeply situated in the orbit the possibility of its being a carcinoma is likely to be overlooked because it is rarely found in this location, and the real diagnosis is not made until sections of the new growth are examined under the microscope.

September 17th, 1918, I was consulted by C. O. H., aged 44 years, because of loss of vision and proptosis of the right eye. About a year before he had an abscess of the upper right incisor tooth, which was followed by pain over the right maxillary antrum. The tooth was removed, which resulted in partial relief of the pain. In April, 1917, a double herniotomy and appendectomy were done. If tumors were found in the abdomen the patient had not been so informed by the surgeon.

In March, 1918, a troublesome diplopia developed which lasted about four months, and only disappeared after the vision in the right eye had become so poor that he could not distinguish objects with it. In May, 1918, he had been refracted and was given:

R. + 0.75 D. Cyl. Ax. 90°.

L. + 0.50 D. Sph. \odot + 0.75 D. Cyl. Ax. 90°, with a +0.50 D. Sph. added for close work. The symptoms were not relieved by the wearing of glasses and the vision continued to fail.

For three months previous to the first examination (Sept. 17, 1918) the vision of the right eye had been failing and the eye had been growing more prominent than the left. He had been refracted early in September and was wearing:

R. +1.00 D. Sph. \odot a 3° prism, base up.

L. +1.00 Sph. \odot a 3° prism, base down.

When first seen the vision of the right eye was nil, the pupil was dilated (5 mm.) and did not react to light but reacted consensually. The right eye protruded forward 6 mm. farther than the left. The displacement was straight forward and the motility of the eye was limited in all directions. He had difficulty in closing the lids of the right eye, but no ulcer of the cornea had developed from exposure. In trying to push the eye into the orbit a definite resistance was met with. Palpation around the globe failed to reveal an abnormality. The preauricular, submaxillary and cervical lymph glands were not enlarged.

On ophthalmoscopic examination, the media of the right eye were found to be clear. The disc was swollen, 1 D., red and slightly vascular, the veins distended and tortuous and arteries slightly contracted. No hemorrhages or exudates were present.

The left eye, vision, with +0.50 D. Sph. \odot +0.75 D. Cyl. Ax. 90°=20/20; movements normal and ophthalmoscopic examination negative.

A diagnosis of tumor of the orbit, probably of the optic nerve, was made. The Wassermann reaction of the blood was negative. Urine and blood counts were also negative. X-ray plates of the head failed to show unusual density in the orbital region or in the nasal sinuses. The sella turcica was of normal dimensions. Nasal examination including puncture and washing of the right maxillary antrum was negative. Thinking that the condition might be syphilitic even tho the Wassermann had been negative, mercury and iodides were pushed for three weeks with no improvement.

Consultation was advised before proceeding to operation. Mr. A. C. Hudson, of London, England, was seen and gave the following report: "The signs appear to me to favor a diagnosis of endothelioma of the optic nerve, which might be dealt with by operation from the outer side of the orbit by La-

grange's method. I should, however, be inclined to make a preliminary exploration from the upper inner corner of the orbit with view of possibility of an inflammatory focus in connection with the posterior ethmoidal cells."

On October 18, 1918, the patient was anesthetized with ether and an incision

As there was no possibility of saving the ciliary nerves and vessels or the eye muscles, the globe was enucleated and fixed in Zenker's solution. The main neoplasm was firmly fixed in the orbit and adherent to the periosteum, and completely filled the apex. It was not attached to the globe or to the lac-

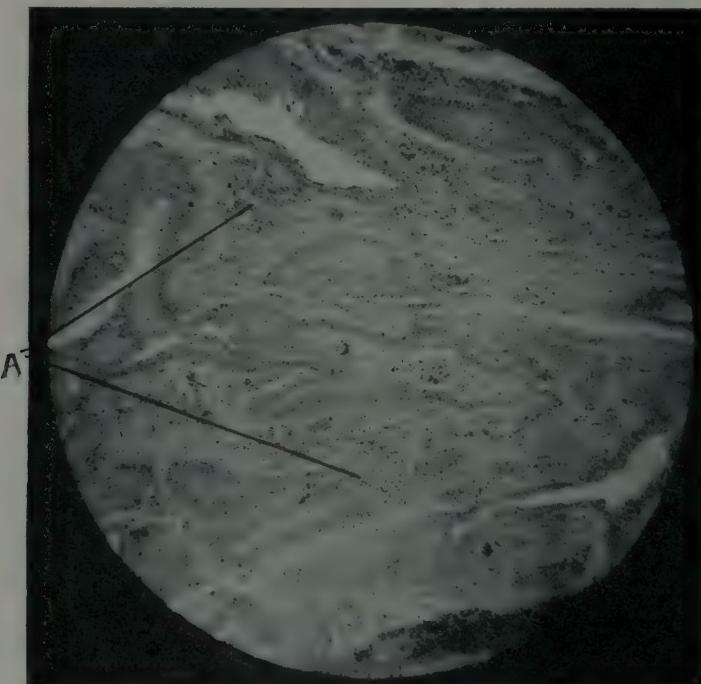


Fig. 1.—Section of tumor showing masses of epithelium surrounded by fibrous tissue. A areas of chronic inflammation.

was made parallel to the line of the orbit above and on the inner side. With a probe the inner wall of the orbit was explored and was found to be smooth. The exploration wound was then closed and the orbit entered after the method of Lagrange. The optic nerve was readily found and palpated with the little finger but no enlargement was discovered. The orbit seemed shallow and filled with a firm smooth mass which included the optic nerve and eye muscles. The mass was so firmly fixed in the orbit that it could not be shelled out with the finger, and it was evident that the apex of the orbit was involved by the tumor.

rimial gland which apparently was normal. It was only with the greatest difficulty that the tumor masses were finally pried loose with a periosteotome. A marked reaction followed the operation but in ten days the wound healed.

Five hard encapsulated tumors were removed. The largest measured 19x15.5x9.5 mm., the second 11x9x8 mm. The smaller tumors were about the size of a split pea. They were fixed immediately in Zenker's solution. The following day the tumors were cut and macroscopically they resembled encapsulated fibromas.

The tumors were imbedded in paraffin and a few thick sections were made from the blocks with an improvised microtome, using a razor for the blade. These were stained with hematoxylin and eosin and examined under the microscope. The thick sections resembled an endothelioma. The patient

filled with a granular debris. The lumen is surrounded by several layers of epithelial cells. (Fig. 2). These cells are embryonal in character and mitosis is present in a few of them. In some areas the epithelial cells rest on a definite basement membrane, while in others the epithelial mass has

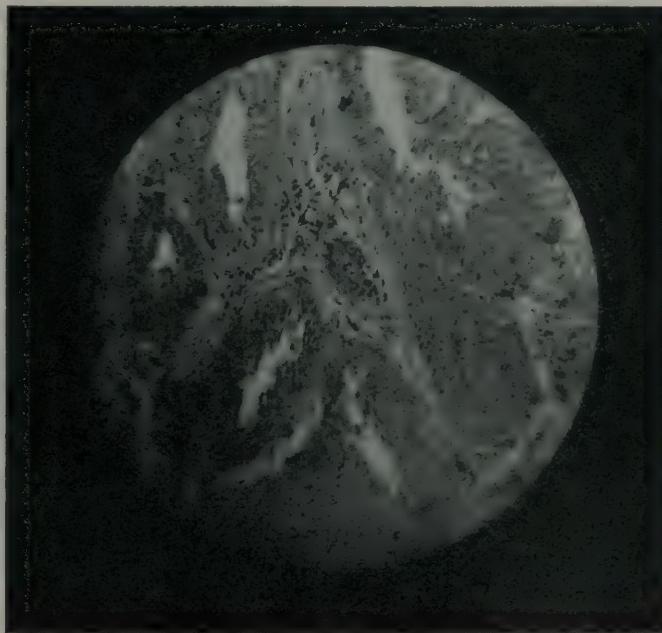


Fig. 2.—High power. Showing a typical gland-like arrangement of epithelial masses.

was instructed to return to America and to immediately consult his surgeon here for farther observation and treatment. His brother was informed of the nature of the growth and told of the possibility of its recurrence.

Later, when better laboratory facilities were at hand the tumor and the eye were sectioned, stained with hematoxylin and eosin and carefully examined.

The tumors were surrounded by a fairly dense mass of connective tissue with trabeculae which go in all directions and surround the muscles, nerves and vessels. There are masses of epithelium scattered irregularly thru the tumor. (Fig. 1). These masses have an atypical gland-like arrangement. A few have a lumen which is usually

broken thru and sends out finger-like projections into the surrounding tissue. In some areas masses of epithelium are found surrounding the coverings of the optic nerve and the eye muscles, but no direct invasion of these structures can be found. No cartilage is found in any of the tumors.

There are several areas of localized chronic inflammation scattered thruout the tumors. (Fig. 1.-A).

The large amount of dense connective tissue with the atypical glandular arrangement of the epithelial cells; and an absence of basement membrane in several locations, with invasion into the surrounding tissues and the embryonic character of the epithelial cells establishes a diagnosis of scirrhous adenocarcinoma.

No metastatic areas were found in the choroid. The optic nerve was swollen by edema and infiltration with a few small round cells which indicated a low grade of chronic neuritis. (Fig. 3).

The author has been fortunate in obtaining the following subsequent history of the patient from his relatives. With the exception of slight discom-

ference with the motility of the eye.

The patient continued to lose strength and died September 8, 1919. An autopsy was not done, and the microscopic nature of the tumors in the chest was not determined.

From the history and clinical findings in this case one might conclude that the primary tumor was in the



Fig. 3.—Cross section of optic nerve showing swelling, with slight lateral displacement of retina.

fort in the face and head, the patient was comfortable until February, 1919, when he began to suffer with pain in the neck, chest and back, which was diagnosed neuritis by his family physician. He was sent to a sanatorium where the diagnosis of neuritis was confirmed. However, he continued to grow worse and in the latter part of June, 1919, he went to the Mayo Clinic, where, after X-ray examination, the diagnosis of multiple tumors in the lungs and probable tumors in the spine and abdomen was made. There was no recurrence in the orbit. Surgical interference was not advised, and the patient returned to his home. In the latter part of July a semiparalysis of the left side occurred and the sight of the left eye began to fail rapidly. There was no pain in the eye or orbit and there were no signs of proptosis or

orbit and that the tumors in the chest and other portions of the body were metastatic. Such a conclusion, however, would be purely hypothetic, and probably incorrect, because of the rarity with which such carcinoma occurs in the orbit.

If the tumor was primary in the orbit, it would be explained by the theory, that, during the development of the lacrimal gland a portion of the ectodermal and mesodermal bud, which is the foundation of the gland, became separated from the true bud and remained as an embryonic nest in the orbit, until such a time that conditions were favorable for its growth. The cells in the nest having embryonic characteristics would undergo rapid development and become a malignant tumor. Wharton and others explain

the occurrence of mixed tumors of the lacrimal and salivary glands by this theory.

The author is inclined to believe that the primary carcinoma existed elsewhere in the body, either in the chest

or abdomen, and that the orbital tumors were metastatic.

The loss of vision of the left eye may have been due to pressure on the optic nerve by intracranial extension from the tumor in the right orbit.

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FOCAL ADJUSTMENT IN THE APHAKIAL EYE

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A case is here reported, in which an aphakial eye obtained good distant and near vision with the same lens and without the conditions that are usually accepted as making it possible. Other cases of the kind in the literature are referred to and the possible mechanism discussed. It is suggested that a limited portion of the vitreous humor may exert the influence of a convex lens which may be varied by muscular action. This is a paper read before the American Academy of Ophthalmology and Oto-Laryngology, October, 1920, to which is appended the report of a second case of the same kind since observed.

The first requisite for the acceptance of any theory is that all of the observed phenomena shall be completely in accord with the principles which have been affirmed. If any instance arises out of harmony with the theory enunciated and more especially if such instances are repeatedly noted, either the accuracy of the observations or the validity of the theory is then open to question. In adding one more to the already long list of cases in which a wide range of focal adaptation was found present in the absence of the mechanism to which that function is universally ascribed, the entire theory is challenged. If insistence is made, as it was by Donders, that "not a trace of accommodative power remains in the eye from which the crystalline lens has been removed, even in the young subject," then some other adequate explanation must be given for those cases in which a wide range of focal adaptation is found present. It is a curious non sequitur that Donders should specifically refer to the *young* subject, since according to the theory of Helmholtz which he accepted, that the power of accommodation is due to the inherent elasticity of the crystalline lens, in the absence of this lens it could make no difference whether the subject was young or old.

The purpose of this paper is not only to report a refractive anomaly which seems to controvert a generally accepted law in ocular physics, but as well to draw from it and others the deductions which would necessarily follow, and which lead to the conclusion that another element than that of the crystalline plays an important role in the normal process of accommodation.

On March 17th, 1920, I was consulted by W. H. M., who was suffering from a slight conjunctivitis following a severe fall from one floor of the shop in which he was employed to the other, which knocked out his front teeth and smashed his glasses. Altho he could manage fairly well without them, they naturally improved his vision and he was anxious to have them replaced. He is 51 years old, of light complexion, heavy eyebrows on the nasal side of each eye, scant on the temporal sides, a strong vigorous man whose musculature is well developed and whose average weight is 175 pounds. He has blue eyes with round pupils of about the size of those usual in light eyed people which is a little smaller than is found in those who are dark. He had been operated on both eyes for congenital cataract when a child by Alfred Graefe of Halle, first in 1872 and again in both eyes for secondary operations on the capsules in 1878.

It is rather interesting in this connection to recall that it was Albrecht von Graefe, the cousin of Alfred (who operated on the case which I have to report) who suggested to Donders that accommodation *did* remain in the eye after the removal of the cataractous lens, and this led to the much discussed point of light experiment by the latter observer.

An examination revealed the following facts:

Without glasses, right vision equals 5/200ths; left vision equals 5/200ths.

Refraction: R. + 10 D. Sph. \bigcirc + 1. D. Cyl axis 105° equals 20/20ths less 2. L. + 9.50 D. Sph. \bigcirc + 1.25 D. Cyl axis 60° = 20/20ths less 4.

Under dilation the pupil of the right eye is found to be slightly irregular because of adhesions on the inner and

lower side leaving a small band of capsular tissue connected with the pupillary margin. Left pupil is round, the area clear as can be determined with the undilated pupil, the conjunctiva free from injection, irides tremulous thruout their entire extent. Ready contraction of the pupil to light, slight but marked contraction of the pupil in effort to accommodate. With O. U. + 2 D. added to his distance glasses he reads more comfortably and easily and prefers the added correction for close work. With the ophthalmometer, the eye being at rest and the mires focused on either cornea when an effort is make to look at a point within the opening of the tube, without a change of direction of the axis of vision, there is a definite blurring of the image and the instrument must be advanced to what would be equivalent to about half of one diopter to make it clear again. In testing the eyes with a small point of light, the form of the light appears to be unchanged in the right eye by any focal effort. In the left eye it becomes slightly elongated.

With the distance correction unchanged in position before his eyes, he reads J. 1 at 7 inches with both eyes; with the left eye closed, he reads J. 1 at 9 inches and *after a few minutes effort*, can carry the print as far as eighteen inches and continue reading. As soon as the left eye is opened and he attempts binocular single vision he is able to bring the type back again to 7 inches. In using the right eye, without any glasses whatever, at short range he closes the lids to a slit scarcely more than 2 millimeters wide, holding the reading matter to the left side of the nose so that he is looking diagonally over the nose and slightly downward over the printed page. With the right eye closed he at first reads with difficulty very large letters, *but the acuity gradually increases* until he is able to read 1.25 D. (about J. 4) at three inches. *The letters blur as he attempts to read but they become definitely clearer when he makes a conscious effort without change of position of the type.* The pupil does not change in size as the type becomes distinct. The ophthalmometer shows there is a slight change in the cor-

neal curvature. How much, it is very difficult to say.

Now if a man 51 years old and having normal eyes were able with suitable distance correction only to read type of the fineness of J. 1 with an amplitude of accommodation extending from 18 inches to 7 inches, we would say that he had extraordinary ciliary power. In the absence of the crystalline lens we naturally ask ourselves, thru what means such a feat could be accomplished. If this were a unique occurrence it would be of great interest but Davis has shown in a paper read before the American Ophthalmological Society last year, that this is not only not unique but this same phenomenon has occurred in many instances even in a more marked degree and under the observation of men of such undoubted ability and veracity that the facts can no longer be questioned.

The title of Davis' paper, "Accommodation in the Lensless Eye," demands a moment's attention. It negates itself. If accommodation is the sole property of the crystalline lens then obviously in the absence of that lens there is no such function, and the affirmation of the presence of focal adaptation is an admission that it must be the result of the action of some other mechanism.

Neither can there be such a thing as a "lensless" human eye. The eye is itself a lens. The common habit of referring to the crystalline as the *lens* of the eye is a looseness of expression that ought not to continue. The eye is a teleomicroscope. Moreover, the most important lens is not the crystalline because the eye can exist and function satisfactorily without it. The essential lens is the *vitreous* which with the cornea and the aqueous constitute a lens of about eight times the strength of the crystalline.

This is not the hypercriticism of a purist in language, important as it always is to use exact terms of expression, but it is urged because the term commonly applied to the vitreous *body* leads the mind away from the essential fact, that it is not a simple homogeneous mass supporting the retina, thru which the rays acted upon by the crystalline are focused, but that it is itself an active agent in the accommodative process and

an essential part in the combined lenticular system.

In his valuable paper of last year, Davis supplements another on the same subject read in 1895 in which he reported two former cases having like focal powers in the absence of the crystalline lens and summarized the literature up to that date. In his more recent paper he very completely reviews the entire subject, and in the report of his case as well as in the discussion that followed, the existence of the phenomenon, altho infrequent, was verified beyond question. In some of the cases, particularly in that of Loring, the focal control was amazing. This discussion of the subject was so complete and recent that it is easily within the memory and reach of those who are interested, so it will not be necessary even to summarize it. To substantiate the case which I am reporting the patient was seen by several very competent ophthalmologists including Starr, Blaauw, Glosser, and others who assisted in determining that the facts were as reported. He was taken before the Buffalo Ophthalmological Club and a further demonstration was made, so that there were at least 20 competent observers who assured themselves that the facts were as given. The facts must now be accepted as fully authenticated. It only remains to determine whether any explanation can be given that will be in harmony with our accepted ideas as to the manner in which this faculty is effected. In the discussion before either the Buffalo Ophthalmological Club or the American Ophthalmological Society, no absolutely definite conclusion was reached. A number of opinions were offered and four reasons were given which were considered in some measure to explain how this anomalous action was produced.

First, the smallness of the pupil; in practically all of the cases either a relatively small pupil or a slit in the capsule was found present.

Second, it was considered that it might be dependent upon the larger size of the retinal images due to the absence of the lens.

Third, that it was an acquired power

of interpreting the circles of dispersion and,

Fourth, that by the tilting of a strong plus glass the monochromatic aberration was neutralized and the ability to interpret the images increased.

But none of these explanations would seem to be valid. It can be readily demonstrated that a small pupil is not sufficient in itself to produce the results which have been shown to be present. If this were the cause of the increased focal range it would have great practical importance. It would justify Tscherning's conclusion that a refractive examination with a pupil widely dilated is less accurate than one with a small pupil. It would suggest the advantage of placing a perforated diaphragm with a small opening before the trial lens when a refractive test is being made. It would be a forceful argument for the more common employment of the simple extraction of cataract as the preservation of the iris intact would not only have an esthetic value but would be of increased visual importance as well.

There can be no question that by cutting off the marginal rays, the clearness of vision is in some measure increased, altho it would have no influence, whatever, on the range of accommodation. I may say I have greatly improved the comfort of cataract patients by placing a correcting lens in the center of an aluminum disc having a diameter of 4 millimeters instead of using the large lens commonly employed. One patient whose eyes grew readily tired with the old correction was enabled to read for hours by means of this device, but a small pupil is not a pinhole pupil and that this range of focal adaptation which is occasionally observed cannot be dependent upon a pupil $1\frac{1}{2}$ to 2 millimeters in diameter can be readily demonstrated. It would be necessary only to place a diaphragm perforated with an opening of that size before the correction lens of any patient who had been operated for cataract and an increased range of focal adaptation would be immediately secured. We know that this cannot be done. We can also eliminate as an ex-

planation any special ability to read fine print either by training or by cutting off the dispersion circles, because one cannot interpret fine print, other than by distinctly seeing it. There might be some basis for the suggestion that by training the visual sense from childhood the aphakial eye might be made to see smaller images than would be possible when the lens had been removed from the eye of an adult; but the question naturally arises, of *what* muscles and *how* could such an effect be produced. All of these explanations would apply equally to every case of cataract that had been operated on successfully, in which the same conditions either were normally present or artificially produced. Cases like these under consideration occur with such infrequency that they have been reported as unusual and extraordinary. Some other element must enter into the condition than that which has so far been noted. In physics there must be a physical explanation of physical phenomena.

Nature is not prodigal in duplicating her methods. If in any of the lower animals and birds a simple measure accomplishes the desired object, the same general plan with perhaps more complicated apparatus is used to achieve a like end in the higher forms of life.

In the eye of the ox it is found that by carefully cutting off the cornea and removing the iris and then with a probe breaking away the adhesions of the ciliary, the entire intraocular structures including the choroid come out en masse. The adhesions between the capsular ligaments, the patellar fossa and the vitreous are firm ones. After then carefully removing the choroid, the iris and the retina, it will be seen that the entire lenticular system is joined together. The fibres of the suspensory ligaments are not lying loosely on the hyaloid membrane but are incorporated in it and extend far back into its substance and it is only by breaking them at the lenticular ring that the lens can be loosened. The attachments then are at the chorioscleral junction at the margin of the

lens and to the hyaloid membrane. The tractive power necessary to change the curvature of the lens, if it were required, would be very great, whereas, the power to pull the vitreous forward would be slight as the crystalline practically floats on the surface of the vitreous. Moreover, another important factor is brought to light in studying the structure of the vitreous. If the posterior portion of the eye of the ox is removed it will be seen that the vitreous appears to be absolutely homogeneous. This is far from being the case. This can be determined by palpation. By applying the finger tip over the vitreous we find that it consists of two parts, an outer portion in which the density is very slight, and which is of a thin gelatinous consistency, and an inner portion which is relatively firm, elastic in feel and in which the difference between the central firmer portion and the outer thinner portion is readily detected by palpation; the outer portion of the vitreous body occupies a space of about from 2 to 2½ millimeters, completely surrounding the firmer central portion. When this is extruded thru an opening in the eyeball we find that it takes on a definite lenticular form. If the entire mass is taken from the eyeball, in a short time the more watery structure runs away, leaving the denser portion behind. There exists at least in the eye of the ox within the vitreous body, a vitreous lens, which together in its adjustment with the crystalline makes a compound lenticular system, thru which all of the functions of vision may be performed with the least amount of effort. (See Fig. 1.)

In the eye of the rabbit the lens is almost spherical and the amount of vitreous outside of it is very small. There would seem to be nothing gained in that case by a change of curvature. Wood and Slonaker have shown in certain birds, notably the sparrow, the anterior posterior length of the whole eyeball, including the cornea, lens and vitreous, is increased during accommodation. In the amphibians the eye is adapted for infinity

and is accommodated for near vision without change of curvature of the lens. The lens is pushed forward by the compression of the vitreous body. Wood in his exceptionally fine article on Comparative Ophthalmology says "that the action of the lens which is true of birds and of some mammals is not applicable to man," and he puts in the qualifying phrase, "if the Hemholtz theory be accepted."

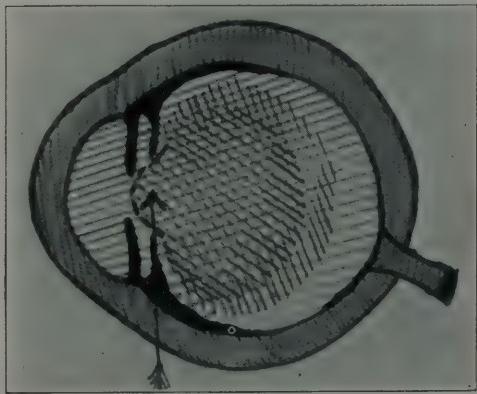


Fig. 1.—Vitreous protrusion or lenticonus, indicated by arrow, produced by pressure in the absence of lens. The ciliary muscle fibres are attached to the suprachoroida, exerting traction on the vitreous lens. In absence of the crystalline lens in the exception cases, the combination of the extrinsic and intrinsic muscles push forward the vitreous lens, and give it the form of a lenticonus, thereby developing a range of focal adaptation.

In the human eye there would seem to be very much the same density in the center of the vitreous as is found in the eye of the ox, but as the number of perfect human eyes which can be obtained for dissection is so limited this fact cannot be at present determined. Now if the mechanism in the human eye resembles that of the ox, an explanation can then very readily be made of the presence of focal adaptation in the absence of the crystalline lens. There would be left the lens of the vitreous which coming up to the pupil would be pressed upon by the ciliary muscle, the retraction of its margins against the vitreous body would force the anterior surface forward, giving it an increased curvature.

A very similar process, as Hess has shown, occurs in the eyes of reptiles

and birds whose extremely plastic lens is forced into a conical projection bulging thru the pupil, thereby increasing its refractive power. This might easily occur in the plastic vitreous after the removal of the crystalline lens, as the external muscles in conjunction with the ciliary attachment to the suprachorioidea are strong

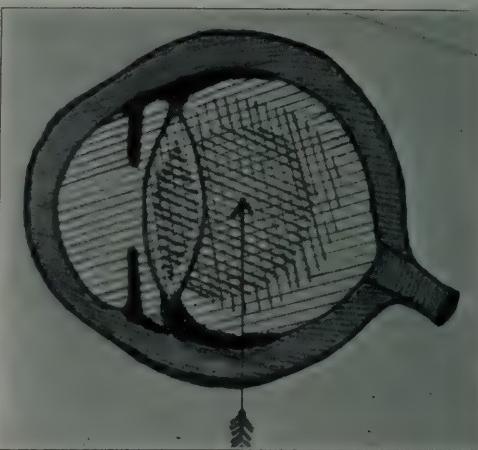


Fig. 2.—Possible vitreous lens, portion of greatest density indicated by arrow. In the presence of the crystalline lens the traction on the suprachoroida relaxes the ciliary bodies, which fill with blood as erectile tissues. The same effort forces forward the vitreous lens, which presses against the posterior part of the crystalline lens, its denser portion pushing forward the more plastic part, in a lenticonus of the curve necessary to meet the focal requirements. Its relaxation allows the blood from the ciliary bodies to flow into Schlemm's canal, the vitreous lens slips back, and the crystalline resumes its normal curve for the eye at rest.

enough to give the necessary pressure. There is reason to believe in these unusual cases that that is precisely what occurs. In the case which I have reported the musculature of the man was exceedingly strong. He had in all probability trained his eye muscles so that there was marked pressure on the sclera in the act of convergence. There could even be direct pressure on the vitreous thru the action of the ciliary, from the same impulse that caused convergence. I refer briefly to the experiments made by Hensen and Voelckers so often reported but never seemingly reproduced, which have demonstrated the segmental action of the ciliary muscle because when any

single ciliary nerve fiber was irritated, "contraction of the iris and the ciliary muscles and the advancement of the choroid takes place only in one isolated portion, thereby making possible astigmatic correction."

Savage approves the theory of segmental action of the ciliary when he says, "It may also happen that a corneal astigmatism may be in part or wholly offset by a lenticular condition of tilting of the lens such as that discussed thru the agency of the action of the individual fibres of Bowman's muscle."

In a paper read before this Academy in 1905 entitled "The Ciliary Process in Accommodation," I said, "The long fibres of the ciliary muscle are attached anteriorly in the sclero-corneal tissue constituting the boundary wall of Schlemm's canal. They are attached posteriorly to the choroid. The fibres of Müller form the angular ring beneath those of Bowman."

The physiologic action which follows would almost seem obvious. A contraction of the long fibres relaxes the zonule. Coincidentally with this, the circular fibres surrounding the margin of the iris contract, impeding the free venous flow and causing the ciliary processes to become turgid, with blood; they in turn pressing, by their bulk, on the anterior part of the suspensory ligament of necessity flatten the edges and protrude the center of the lens in exactly the form that catoptric tests have shown to be present.

Accommodation having been completed, the muscles relax allowing the vessels which had been full, to empty, in all probability in doing so allowing the overflow to pass into Schlemm's canal.

It will be evident from this that as the artery leads by way of a very large capillary into the anastomosing mass of veins the passage of blood into the ciliary processes is practically unimpeded. That an increase in bulk in the ciliary region occurs in accommodation, has been noted by Tscherning who does not ascribe it, however, to the cause which I have given. He

says, "There is formed during accommodation at the anterior surface of the iris a circular depression—the peripheral border of which corresponding to the ciliary body rises in a peak while the central border presents a very gentle slope corresponding to the anterior surface of the crystalline lens."

It is now possible to add to this the further observation that the action of the ciliary muscle thru its traction on the hyaloid membrane, forces forward the lens of the vitreous, this pressing against the crystalline lens, forcing the denser nucleus against the more plastic cortex and causing the anterior part of the crystalline to protrude to just the degree needed to give the required focal length. The action produced in this way is in perfect harmony with all of the observed facts. It is accomplished easily, quickly, and under normal conditions without strain. (Refer to figure 2.) The figures were very kindly drawn for me by Dr. W. H. Phillips.

The segmental action of the ciliary muscle explains in the only possible way the production and the correction of lenticular astigmatism. It is the only reasonable explanation of the existence of focal adaptation in the absence of the crystalline lens. It makes clear the pathology of the softening of the ocular structures in malignant myopia and of the changes occurring in progressive corneal astigmatism. The acceptance of this new theory will require the writing of a new ocular pathology based upon a fuller understanding of the actual changes which occur in the accommodation in the human eye.

ADDITIONAL CASE.

The following are the notes of a second case, in which the patient had a wide focal range in the absence of the crystalline lens. A man seventy-two years old in normal good health I operated on for mature cataract by combined expression on the 20th of October, 1920. A vertical upward iridectomy was the width of the pupil, $2\frac{1}{2}$ millimeters. The pupillary area was

clear; a slightly opaque portion of capsule remaining above, but leaving a clear area of an average diameter of $2\frac{1}{2}$ millimeters. The mires of the ophthalmometer overlapped half a diopter at 15 degrees. Details in the eye ground could be easily seen with a plus 4. The refraction was as follows: Right eye (operated eye), plus 11 D. sph. plus 2 D. cyl. axis 15 vision equals 20/20ths less 2 letters. Without glasses with the operated eye he is able to pick out words in Jaeger 6 at a distance of 5 inches. With his distance correction he is able to read Jaeger 1 easily at any point between $9\frac{1}{2}$ and 22 inches. He prefers

an addition of plus 1 over his distance glasses for reading. He read the newspaper during an entire evening with his distance glasses, without changing their position before his eyes, without discomfort and found that the use of his distance glasses alone for all purposes is so comfortable and convenient that he declines any additional correction for reading. He has evidently the equivalent of a range of accommodation that would be found in a person under 40 with accommodative power. There was, of course, no change in the position of his glasses in making the tests and the paper was held in the normal position before his eyes.

WHY WE ACCOMMODATE.

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This paper sets forth a hypothesis regarding the method in which light falling upon the retina incompletely focussed may provoke the muscular action required to secure its accurate focussing. Read before the American Academy of Ophthalmology and Oto-Laryngology, October 14, 1920.

It would seem supererogatory to bring up the subject of accommodation before this society, since the main facts of the mechanism of accommodation are well known to all of you. And yet, conversation with some of our best informed members has failed to bring an answer to the question of *why* we accommodate, and I do not recall ever having seen in the literature an explanation. It seems to have been accepted as a fact, without exciting any special interest in the reason, like many other common occurrences.

This question may be stated in a somewhat different form, namely, what phenomenon occurs within the eye when an object is brought from 6 meters away to 1 meter from the eye, that sets up the train of events culminating in an increase in the curvature of the lens of sufficient amount to enable the individual to see it distinctly at the latter distance? Conversely, what occurs when the object is moved from the latter to the former distance that causes a reversal or nullification of the previous state, so that the curvature of the lens becomes less?

It is perhaps impossible to obtain an answer to these questions whose correctness can be proven, but it is at least possible to discuss the factors entering into the problem, in an attempt to formulate a theory which will satisfactorily explain the initiation of the act of accommodation.

In the following discussion, the associated acts of convergence and contraction of the pupil will be disregarded, for while they are synergistic, they are not essential to the act of accommodation. Convergence may take place when the accommodation of one or both eyes is paralyzed, and conversely, accommodation is still present in the remaining eye when one has been removed. Paralysis of the accommodation is usu-

ally associated with paralysis of the sphincter iridis, but the reverse is not always true, since it is possible to dilate the pupil without affecting the accommodation, for example by decreasing the amount of light entering the eye. Therefore it is possible, from a causal standpoint, to regard the act of accommodation as an isolated one.

When an object is brought closer to the eye than 6 meters, two physical facts follow: in the first place, the visual angle formed at the eye by the rays from the extremities of the object becomes larger, and this increase is proportionate to the proximity of the object to the eye. In the second place, the rays of light originating at any point on the surface of the object, after passing thru the dioptric system of the eye no longer meet at their former focus, but at some point posterior to it, dependent on the proximity of the object to the eye. This of course assumes that the accommodation is inactive.

Within certain limits, the size of the visual angle determines the size of the image formed on the retina. Now it is conceivable that as soon as the retinal image has increased beyond a certain size, or in other words, as soon as the rays from the extremity of an object have formed an image which extends over a certain number of rod and cones, a stimulus travels up the optic nerve to the centers of accommodation, convergence and pupillary contraction, which brings about these acts. While this is possibly true for pupillary contraction, it is certainly not true for the other two. Leaving convergence out of consideration, if accommodation were evoked by the varying size of the retinal images, the same sized retinal image should always cause the same amount of accommodation in the same eye, at least at the same period of life.

But this is not true, because the image formed by an object 2 feet away from the eye is of the same size as that formed by an object 10 times its size 20 feet away, as shown by the diagram. In the former case there will be an act of accommodation, while in the latter there will be none. (Fig. 1.)

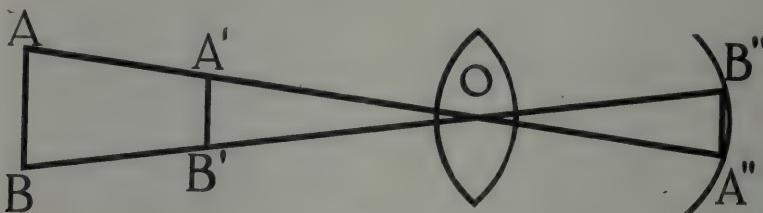


Fig. 1.

Showing image of the same size formed by different sized objects at different distances.

Let AO and BO be the rays of light from the extremities of the object, AB. Then AOB will be the visual angle, and B''A'' the image. But B''A'' will also be the image of every object thru whose extremities the rays AO and BO pass, for example A'B'.

The second fact might be stated somewhat differently, namely, that as an object approaches the eye, the focus

Except when the focus is on the retina, the rays from any point on the object reach the retina in the form of a circle, as seen in the following diagram. (Fig. 2.)

Let L be the dioptric system of an eye, and H, E, and M be the positions of the retina in the case of hyperopia,

emmetropia and myopia, respectively. Let OA and OB be two rays from the point O on an object closer to the eye than 6 meters. Then A'B', A''B'' and B'''A''' will be the diameters of the circles formed respectively upon the retinas H, E, and M by all of the rays originating at the point O. The size of the circles in the emmetropic and hyperopic eyes is directly propor-

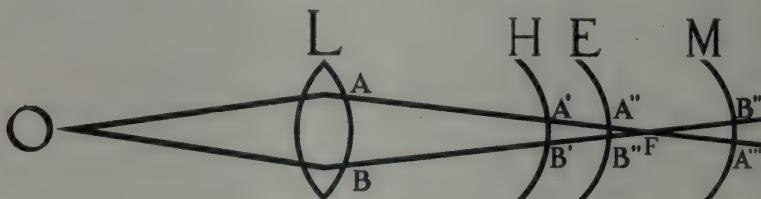


Fig. 2.

Rays not focussed on the retina forming circles of diffusion.

of the rays arising from any point on its surface recedes, assuming that the accommodation remains quiescent. If we are dealing with a myopic eye, the focus will pass thru three stages, in front of, on, and behind the retina, according as the object approaches, reaches and passes within the far point of the eye. In a hyperopic eye, and in an emmetropic one, after the object has approached closer than 6 meters, the focus is always back of the retina.

tional to the proximity of the object to the eye, and in the myopic eye is indirectly proportional until the object passes within the far point when it is directly proportional. Now the amount of accommodation is also directly proportional to the proximity of the object to the eye, and it would seem a logical deduction that the amount of accommodation is directly proportionate to the size of these circles, and that therefore the appearance of and

the varying size of these circles is the direct cause of the act of accommodation. But this cannot be true, because it is possible for an object at an infinite distance to form circles on the retina of a myopic eye of the same size as those formed on a hyperopic eye. This is shown by the following diagram. (Fig. 3.)

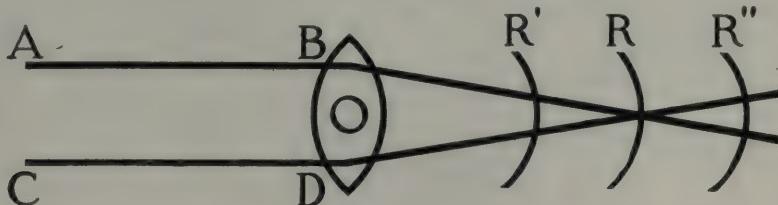


Fig. 3.

Circles of diffusion of the same size formed in hyperopia and myopia.

Let AB and CD represent rays coming from a point on an object at an infinite distance from the eye. When they reach it they are practically parallel. Let O represent the dioptric system of three eyes, one hyperopic, one emmetropic and one myopic. Let R', R, and R'' represent the positions of the retinas of the respective eyes.

sented by connecting the various points formed by the intersection of the retina by the rays coming from any one point on the surface of the object. At the same time these intersected rays impinge upon and stimulate a certain number of retinal nervous elements, as shown by the following diagrams. (Fig. 4.)

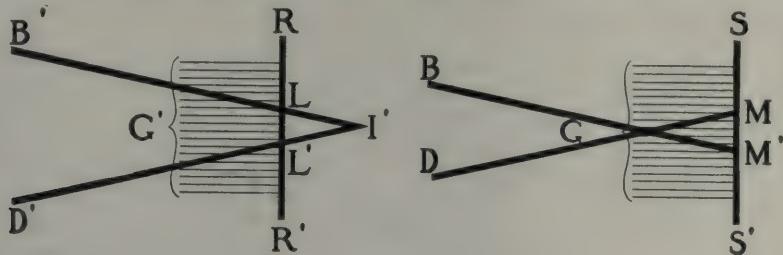


Fig. 4.

Showing obliqueness of rays falling on the layer of rods and cones in hyperopia and myopia.

The focus falling on R, there will be no circle in the emmetropic eye, but there will be on R' and R'', and if they are at the same distance in front of and behind R, respectively, the circles formed will have the same diameter. But in the hyperopic eye there will be an effort of accommodation, whereas in the myopic eye there will be none. Of course, these circles are very small, but they exist in the nonaccommodating eye, and may be graphically repre-

have passed beyond the focal point of the dioptric system of the eye. Let L L' equal M M'. Let G' and G be respectively the retinal elements traversed by the rays of the respective eyes. If these diagrams are compared, it will be seen that there are two distinct differences in the relation of the rays to the retinal elements in the two eyes. In the first place the number of elements traversed by the rays in the hyperopic eye is apparently greater

than in the myopic eye. If the object were very close to the hyperopic eye, or if the myopia were very low, this factor might enter into the problem. But as a matter of fact, the numbers of elements involved must be very small in any case, so that this feature of the problem may be disregarded. But there is a distinct and outstanding difference. In the hyperopic eye, the rays are converging, or in other words they are passing obliquely thru the nerve elements, in a direction from the periphery towards the center. In the myopic eye, however, they also pass obliquely, but the direction is from the center towards the periphery. This difference in the obliqueness of the rays is, in my opinion, the cause of the presence of the accommodation in the hyperopic eye and its absence in the myopic one, when the object is beyond its far point.

Let us see what will happen in the various eyes when the position of the object is changed. In the hyperopic eye, the closer the object is to the eye, the further back is the focus of the rays, the larger is the diameter of the circles, the greater the obliqueness of the rays in passing thru any one retinal element, and the greater the effort of accommodation. Conversely, the further away the object is from the eye, the closer to the retina is the focus of the rays, the smaller the diameter of the circles, the less the obliqueness of the rays passing thru any one element, and the less the effort of accommodation. Since the object cannot recede beyond infinity, and since the relation of the retina to the dioptric system of the eye is such that the rays are always focussed behind it, the rays always pass obliquely converging thru the retinal elements and there is always an active accommodation present, provided the ciliary muscle is active.

In the myopic eye, on the other hand, the closer the object is to the eye, provided it is beyond the far point, the nearer the focus of the rays to the retina, the smaller is the diameter of the circles, and the less the diverging obliqueness of the rays. At the mo-

ment the object comes closer to the eye than its far point, the focus passes beyond the retina and the direction of the obliqueness of the rays changes from a diverging to a converging. Simultaneously, an effort of accommodation is initiated. From this point the sequence of events is the same as in the hyperopic eye. Conversely, as the object recedes from the eye, there is a decrease in the converging obliqueness of the rays, accompanied by a decreasing amount of accommodation, until the far point is passed, when they are replaced by diverging obliqueness and absence of accommodation.

In an emmetropic eye, when the object is at infinity, the focus lies on the retina, and the rays are converging as they reach the retina. In the drawings, the size of the retinal elements has been greatly exaggerated, nevertheless, they have a certain height and must be cut somewhat obliquely converging. Theoretically, at least, an emmetropic eye must be exerting some effort of accommodation, even when looking at an object at an infinite distance. When an object lies at a finite distance from the eye, the sequence of events is the same as in the hyperopic eye.

The theory which I would offer to explain the causation of accommodation, is, therefore, the following:

(1) The act of accommodation is caused by rays of light from any point on the surface of an object passing thru the perceptive elements of the retina while still converging, or passing in an oblique direction from the periphery towards the center.

(2) The amount of accommodative effort is directly dependent on the obliqueness with which the converging rays reach or pass thru the retinal elements.

(3) Altho the mechanism of accommodation is of phylogenetic origin, accommodation itself is an acquired act, due to the individual learning from his experiences that certain sensations due to converging obliqueness of rays mean that an object lies closer to his eye than their far point, requiring certain muscular efforts to permit it to be seen

distinctly. This takes place so early in the life of the individual, that by the time he is a few months old it has become subconscious or involuntary.

As corollaries to this theory it should be true that:

(1) The act of accommodation should always be present in a hyperopic eye.

(2) The act of accommodation should be present in an emmetropic eye when the object looked at is at infinity (or its equivalent, 6 meters), but especially when it is at a finite distance.

(3) The act of accommodation should be present in a myopic eye whenever the object looked at is closer than the far point of the eye.

(4) The act of accommodation should be present in any eye when the rays reach it after passing thru a concave lens sufficiently strong to alter their course so that they are converging when they reach the retina.

(5) The act of accommodation should be absent in any eye when the rays reach it after passing thru a convex lens sufficiently strong to alter their course so that they are diverging when they reach the retina.

(6) The act of accommodation should be present in an astigmatic eye when either or both of the principal meridians refract the rays so that they converge as they approach the retina. The pain so frequently present in astigmatism is probably due to difference in the amounts and characters of the obliqueness of the rays passing thru the principal meridians, resulting in differences in the amount of stimulus towards accommodation, or even in a stimulus towards accommodation and a simultaneous stimulus towards relaxation of the accommodation. This

warring of stimuli or their effects causes the direct pain in the eye, or referred pain in the head, or reflex symptoms such as dizziness, malaise, or disease such as blepharitis.

(7) A myopic eye with active accommodation should accept a stronger glass than its real refraction because the tendency of a concave lens is to make the rays divergent. As soon as the focus is made to recede to the retina, there is evoked an effort of accommodation due to the converging obliqueness of the rays, which throws the focus in front of the retina, allowing a stronger concave glass to be accepted.

(8) A hyperopic eye with active accommodation can never accept a stronger glass than its real refraction, and usually will accept a weaker one, because the tendency of a convex lens is to make the rays converging. But the tendency of the accommodation is also to make the rays converging. When the sum of the two brings the focus on to the retina, there will be clear vision. Additional strengths of convex lenses will tend to bring the focus in front of the retina and vision will be obscured until the divergence of the rays after they pass the focus causes the accommodation to relax and allows the focus to recede to the retina. As soon as the accommodation is completely relaxed, additional strengths of convex lenses will cause the rays to diverge obliquely and vision will be obscured.

This theory is offered in the hope that it will bring out a discussion of this question, and if incorrect, will lead to an investigation and a solution which will be in conformity better with known facts.

CRANIAL DEVELOPMENT FOLLOWING ENUCLEATION IN EARLY YOUTH—POSSIBLE EFFECTS IN ADULT YEARS.

GILFORD DICKINSON, M.D.

SYRACUSE, N. Y.

This is the report of a case in which the eyeball was enucleated at the age of three years. Great contraction of the conjunctival sac and other soft parts followed, with very marked alteration in the walls of the orbit, as shown by the radiograph.

It is interesting to note how strictly nature conforms with the general developmental laws with regard to the bony framework of the body. This is no less true, even where normal growth is interfered with and artificial conditions substituted.

The human orbit is composed of the frontal, malar, lacrimal, ethmoid, sphenoid, and superior maxillary bones. The frontal and external, or temporal portions of the maxilla, are by far the thicker and more sturdy portions of the orbit, this by reason of necessity for greater protection at the superior and temporal portions. The inner lower quadrant of the orbit is quite thin and capable of withstanding but little trauma. With these facts in mind one would expect that where the development of the orbit is interfered with, nature would respond by increasing the growth of the thin least resistive portions, but this is not the case. The tissue increase confines itself to those portions that are the heavier, and for the reason mentioned above, which necessitates the greater protection for the cranial cavity.

After enucleation in early youth the loss of orbital structures and tissue is at once resented and the organism attempts to replace the defect by such increase in surrounding bony framework as is possible. This is of course quite limited but yet sufficient to be worthy the attention of operators that they may devise a successful method of compensating for the tissue loss, thereby preventing some of the untoward results of later years. It will be noted that the attempt to close the defect is almost entirely from above downward. The extension of the frontal ridge in some cases is half the orbital cavity; and, as in the case illustrated below, the increase in the frontal sinus on the affected side doubles its normal size. The floor and external wall

remain practically the same as on the unaffected side.

The resulting enlargement of the frontal sinus on the affected side is of importance with regard to symptoms developing in later life, as it tends to be a selective site for focal infections of considerable extent. With such patent cells, and area of mucosa so great, a chronic infection of a mild type persists for years and is a constant source of annoyance, when it is not a direct causative factor of neuralgia of the ophthalmic branch of the fifth nerve.

The great discomfort, very often unbearable pain, suffered by these patients; the few and too often unsuccessful remedies at the disposal of the physician, together with the chronicity of the malady, makes the solution of the problem most desirable.

The following is a report with photographic radiograph of a typical case.

CASE.

Mrs. W., age thirty-five years; three healthy children; no premature labors; Wassermann negative; has had no previous illness other than the common diseases of childhood.

At the age of three or four years, the left eye was enucleated, the cause of this operation not being entirely clear at present, but as near as can be determined there was a penetrating injury, and sympathetic ophthalmia was feared. No attempt at any tissue replacement was made. The recovery was uneventful.

When about ten or twelve years old there was a recurrence of severe pain in the orbit and surrounding areas. This was attributed to "rheumatism" and nothing was done to relieve it. This attack was limited to a couple of weeks after which there was freedom from pain for about a year. At the time of the next attack the suffering was so

acute that the oculist was consulted, who advised another operation; just what was done at this operation is not known. There was no cessation from pain in spite of the operation, and the child was taken from school and sent to the country for a rest.

After being on a farm for a week or so the pain entirely disappeared; and as

physician and "chiropractic" being without avail, the suffering continually grew worse until the patient was unable to either sleep or eat, and when seen by the writer early in June she was extremely nervous, under weight, and on the verge of collapse. The lids and surrounding skin areas were so sensitive as to make examination impossible at this

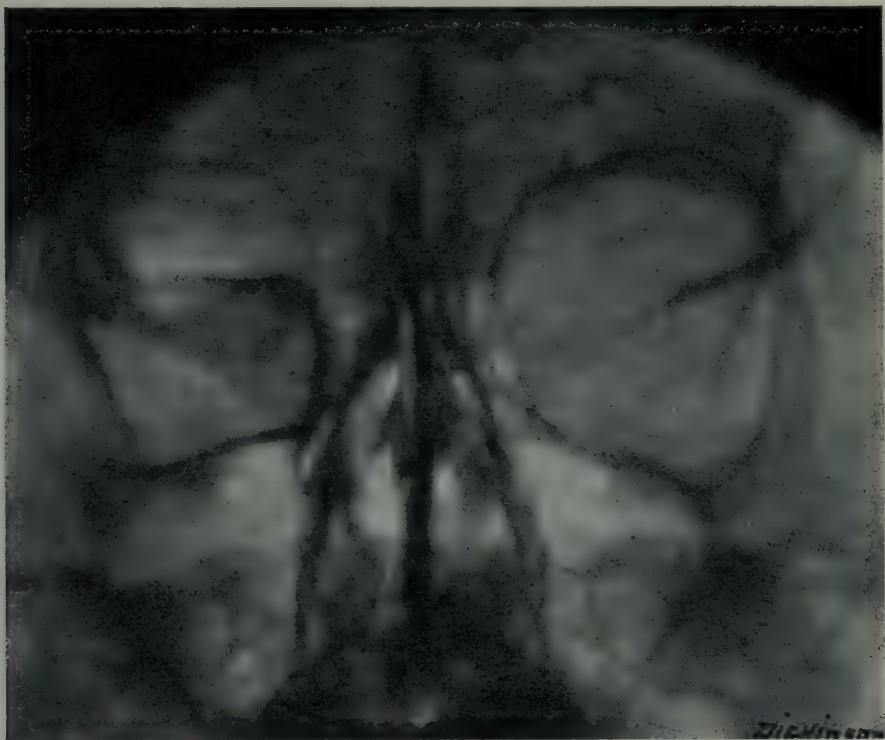


Fig. 1.—Radiographs of orbits and adjoining parts in adult after enucleation of left eye in early childhood. Overgrowth of bony walls of left orbit, especially above; with enlargement of left frontal sinus.

it did not recur, she again returned to the city and resumed her studies. It might be added here that nothing was worn in the orbit, but it was covered with a ground glass spectacle.

The patient had been free from any recurrence of the trouble until she was about twenty-nine years old, at which time she had a mild attack which yielded to the treatment as prescribed by the family physician.

The next attack commenced in January of this past year and was the most severe yet experienced. The efforts of

time, so the patient was sent to the hospital for rest and general building up.

After four days, a careful examination showed the upper lids firmly adherent to the orbital conjunctiva, in such a manner that the greatest palpebral opening possible was less than four mm. The radiograph is reproduced and shows the contracted orbital cavity. It was decided to operate and free the lid as far as possible in hope that the removal of the contracted scar tissue might afford relief; as it was possible that it caused tension or traction on the supraorbital

branch of the ophthalmic division of the nerve.

At the operation the entire lid was freed, and some of the scar tissue removed, especially that portion adjoining the periosteum of the roof of the orbit. What conjunctiva could be picked up was drawn together with silk, and a sterile rubber insert placed between it and the lid. After four days the rubber insert was removed. Recovery was uneventful and the lid remained free. The pain ceased following operation and up to the present time there has been no recurrence of the trouble. The size of the orbital cavity makes it impossible to make use of an artificial eye of any type.

It is the writer's belief that the pain

will again recur at some future time, and that the temporary relief following operation was due to removing some traction on the nerve which will again obtain when the remaining tissue contracts sufficiently. That the irritation of the nerve was caused by the contracted orbit, due to the bony overgrowth is open to question; and can only be ascertained by checking a large series of such cases which is not an easy matter as the space of time elapsing is so great. However it would be interesting to note the results as seen by radiograph in cases of enucleation in children where implantation methods are used; could these cases be followed to adult life.

BLEPHAROCHALASIS WITH PTOSIS; REPORT OF A CASE.

EDWARD B. HECKEL, M.D.

PITTSBURGH, PA.

This is the report of a case and of the microscopic examination of the excised tissue. Read at the meeting of the American Academy of Ophthalmology and Oto-Laryngology, October, 1920.

The condition known as blepharochalasis is sufficiently rare to warrant the report of even a single case. This name was suggested by Fuchs in 1896, when

stretched, relaxed and falls into many small folds.

In 1913 W. B. Weidler of New York presented a comprehensive study on ble-



Fig. 1.—Case of blepharochalasis affecting right upper lid. Wrinkled redundant skin. Left eye normal.

he reported a series of cases. The condition, however, had been recognized before and attention called to it by Mackenzie in 1854. A number of terms have been used to describe this condition, e. g. "Ptosis cutaneae," "Dermatolysis palpebrale," "Paupières en besac," "Pseudoleukemia lymphatica," and "angiomegalie de paupières." But blepharochalasis seems to be the most appropriate, as the word itself means lid-relaxed, and there certainly is a relaxed condition of the skin. The skin is thin,

pharochalasis before the section on Ophthalmology of the A. M. A., reviewing the previous literature and adding two cases of his own. Since then Edward Stieren of Pittsburgh reported two cases in 1914 before the American Ophthalmological Society, and in 1916 R. L. Randolph of Baltimore reported one case before the same society.

It is a condition of early life and usually found in girls between the age of eight and nineteen years. Weidler thinks there is some connection between

the appearance of the menstrual period and the development of the condition known as blepharochalasis. The concomitant appearance of this condition, however, with the menstrual function in some isolated cases, is not sufficient to warrant the conclusion that it is a causative factor. It is false logic, in fact a

words can tell. In all of the cases heretofore reported, I believe, the condition has been bilateral and there was not complete ptosis. In the case about to be reported the condition was monolateral, with a complete ptosis, which raises the question whether or not ptosis is not always a concomitant condition in mono-



Fig. 2.—Case shown in Fig. 1 after operation; excising crescent shaped piece of skin and subcutaneous tissues with some orbital fat.

case of "post hoc ergo propter hoc." There may be, however, some relation between an angioneurotic edema and the development of this condition, for it seems that it may begin as an edema of the subcutaneous connective tissues, which later results in a loss of elasticity and a consequent stretching of the skin and an atrophy of the subcutaneous tissues of the lid. Just why it involves the upper lid only, no one has attempted to explain.

Figure 1 illustrates this condition of the skin with its redundancy and thin tissue-paper like appearance, better than

lateral cases and absent in bilateral cases.

Miss Ethel S., age 19 years, family history negative, has always lived on a farm, physical condition good, subsequent laboratory tests negative. Began to menstruate at fourteen years, at which time it was first noticed that the upper lid would swell at times with a slight droop. This droop gradually increased so that it soon became complete. The left eye was negative. (See Fig. 1.)

It has been suggested by some writers that in this condition there is a hernia of orbital fat. The protrusion of the eyeball was measured by the exophthalmom-

eter, and the right eye, the one with the blepharochalasis, was found to protrude 3 mm. beyond the left. Some months after the operation another reading was made and no protrusion or exophthalmos was evident.

The refraction of the eyes was as follows:

R.V. 20/200, and 20/30 with +1.75 s.

L.V. 20/20, and 20/20 with +1.00 s.

On November 22, 1915, the patient was operated, by excising a crescent shaped piece of skin with the subcutaneous tissue and some orbital fat. The wound was stitched with interrupted sutures, seven in all. The middle suture

was passed down into the tarsus of the lid. The healing was prompt and uneventful. The result after operation is shown in Fig. 2.

MICROSCOPIC EXAMINATION.—The excised section consisted of skin, subcutaneous tissue and adipose tissue. There was a thickening of the stratum corneum with flat epithelial cells in many layers. There was an absence of adipose tissue in the corium and general atrophy of the papillae. The stratum reticulatum was deficient in elastic fibres, showing a general atrophy. There was wide separation of the fibres in the subcutaneous cellular tissue, suggesting a preexisting edema.

NOTES, CASES AND INSTRUMENTS

APHAKIA, NEAR VISION WITH DISTANCE GLASSES.

W.M. R. FRINGER, M.D.

ROCKFORD, ILL.

On November 2, 1903, I did an extraction after a preliminary iridectomy on the right eye of Mrs. Wm. Harvey, aged 53.

Dec. 29, 1903, R. + 11. \odot + 1.50 axis 120° vision equals 20/20ths.

The immature cataract in the left eye had advanced to such an extent that she was now dependent upon the operated eye for her seeing eye. The above correction was ordered for distance and she was to return in 3 or 4 weeks for her near correction. When she returned she stated that she could read with the glasses she had. She was able, without changing the position of the glasses on her nose, to read Jaeger No. 4 at 16 inches and continued to do so until Oct. 15, 1904, when I did a needling on the right eye because the vision had fallen to 20/70ths. After she recovered from the needling, with the correction she was then wearing plus 11. \odot plus 1.50 axis 120, her vision returned to 20/20ths and she continued to use the above lens for distance and near with comfort, and of course without changing the position of the frame on her nose. On January 15, 1907, I did an extraction on the left eye following a preliminary iridectomy.

February 13, 1907. Left eye + 10.50 = 20/30ths.

Correction ordered.

May 4, 1911. Right eye + 10. \odot + 1. cyl. axis 120 = 20/20ths.

Left eye + 11.50 = 20/20ths. She wore this correction with the ability to use each eye for distance and near until April 19, 1915, when I did a needling on the left eye because vision had dropped.

April 28, 1915, L. E. + 11. \odot + 0.50 axis 180° equals 20/20ths.

June 24, 1915, R. E. + 10. \odot + 1. axis 120° equals 20/20ths; L. E. + 10.50 \odot + 0.50 cyl. axis 180° equals 20/20ths.

With this correction she used her eyes for distance and near until March 21, 1918, when she came to me with the statement that her eyes tired when she used them for near. She still had the ability to read Jaeger No. 4 at 16 inches.

Right eye + 11. \odot + 0.75 axis 120° equals 20/20ths.

Left eye + 10.50 equals 20/20ths.

With the correction, with the right eye she read Jaeger No. 4 at 16 inches, and the left eye Jaeger No. 3 at 16 inches. I ordered in Kryptoks the above correction with plus 2.50 added. I did not see her again until Oct. 22, 1920, when I phoned her to come to my office. With her distance correction she is able to read with right eye at 16 inches Jaeger 4 and with the left J. 6. She had the ability to read with her distance correction both before and after the needling operations. In the right eye the opening after the needling was very small, and is now clouded over by a very thin membrane which renders the fundus slightly hazy. The opening after the needling in the left eye was large and still remains so.

Mrs. Harvey was an excellent patient. The recoveries after the various operations were uneventful. She is a woman in comfortable circumstances. She has been in Scotland and California once, if not more, since wearing her cataract lenses. She read a good deal and sewed also. She tells me that she never had any trouble in threading her needle.

PARALYSIS OF ACCOMMODATION FOLLOWING A PERITONILLAR ABSCESS.

J. WARREN WHITE, A.B., M.D., F.A.C.S.

NORFOLK, VA.

This case was referred to me by Dr. R. S. Spilman of Norfolk, Virginia, with the following history:

He first saw the girl on September the second. She was 9 years old, and had been sick in the country several days before being brought into the city.

On examination he found a peritonillar abscess on the right side which was immediately incised.

He took two cultures from the throat at different times and they were both negative as to the Löffler bacillus.

The case was seen by me on September the 30th, with the following complaint, constant headaches and being unable to read at school.

The vision was 20/100 o.u. There was a complete paralysis of accommodation but no paralysis of the sphincter pupillae. A plus 2.50 sphere o.u. gave her 20/30 plus o.u., and plus 2.00 sphere o.u. had to be added for reading.

I gave her strychnin sulphat with increasing doses, and October the 21st plus 1.75 o.u. gave her 20/30 plus o.u. and plus 1.00 o.u. had to be added for reading. On October the 28th, her vision was 20/20 o.u. and she was able to read without any difficulty.

BLINDNESS FROM METHYL ALCOHOL POISONING.

V. R. HURST, M.D.

LONGVIEW, TEXAS.

E. S., age 47, on May 4, 1920, drank a large quantity of methyl alcohol. Examination five days later showed vision O.D. no light perception, O.S. counting fingers at 3 feet. The pupils were equal, round and moderately dilated. The media of both eyes were clear and ophthalmoscopic picture was one of a neuroretinitis, the left, with some vision, showing more edema of disc than did the right, which was totally blind.

Under the usual treatment the vision in the left eye improved rapidly, but when he was able to return to work he found that he could not distinguish the flame of a fire nor the bulb of an electric light. This I have called "flame blindness." In lighting an oil heater he knew that it was burning only by feeling the heat as the flame was not visible. When the vision had improved to 6/60 he could not locate a 100 C. P. light. The color vision was normal, but the visual field was much contracted, especially for red.

The patient remained intoxicated a large part of the time, and failed to return as often as necessary to give a complete history. Notwithstanding his imprudence the vision in the left eye im-

proved until now, seven months later, it is 6/6, with light (flame) perception normal, but the field much contracted. Vision in the right eye is counting fingers at 3 feet, with no central flame perception, but can slightly distinguish a light by holding it at the periphery of the visual field.

PAPILLITIS; GLIOMA OF THE BRAIN.

G. N. BRAZEAU, M.D., D.Oph., F.A.C.S.

MILWAUKEE, WIS.

Inflammation of the terminal end of the optic nerve is of two kinds. The first, essentially inflammatory in nature, reveals all the characteristics of true inflammation and manifests itself by purely functional troubles. The second variety, with which this paper will deal, is papillitis by stasis, of von Graefe. These two types are not as markedly different as one might at first believe, so, in view of their different consequences, they should be considered separately as distinct morbid entities. The papillitis by stasis will be best illustrated by reviewing a case that consulted me for failing sight. Briefly, this is the history:

A man, age 60, nationality Irish, a farmer, history good, has always been well and strong up to about the time his sight began to fail. This was his chief complaint. There was no headache, no vomiting, nor paralysis. V 20/50. The eyes appeared normal. Fundus examination showed a typical picture of bilateral papillitis, with its tortuous and engorged veins and filiform arteries. The nerve head looked like a mushroom, projecting into the eye. There were no signs of retinal hemorrhages and the borders of the disc were very blurred in the mass of edematous swelling and capillary distension. Further observation revealed recurring spasms of the muscles of the right side of the face, motor aura, like a grimace. During these spasms there was a tendency to fall forward, tho no loss of consciousness. These spasms would last about a minute to recur again at varying intervals during the day. Here was a typical case of Jacksonian epilepsy of the facial

type. The diagnosis seemed easy in such presence; it was papillitis due to a tumor of the brain, with Jacksonian epilepsy.

The character of the neoplasm was undetermined as the case was lost to further observation. The good history of the patient assisted materially in differentiating between a neoplasm and the various other causes capable of producing such papillitis. There were no evidences of either meningitis, tuberculosis, syphilis or sinuitis.

Gliomas of the brain substance probably lead in frequency and in malignancy among the brain tumors. However, independent of its nature there was a tumor, most probably a glioma involving the inferior cortical portion of the ascending frontal convolution. From the restricted epileptiform seizures, we can assume the tumor to be a small one. It is regrettable that the Roentgen rays should be powerless to assist us in either localizing or determining the size of these tumors of the soft tissues, for only where deposits in these growths occur, is there sufficient visibility to be worthy of attention. Thus are we referred to the autopsy room for positive information. In choked disc, the vision may be but slightly altered, while inversely, there may be marked diminution in vision and color, with no ophthalmoscopic findings in the first form. A periodic loss of vision testifies to a tumor. These, together with the Jacksonian epilepsy, leave no doubt as to the cause of the papillitis. In one hundred cases of brain tumor, papil-

litis was present in 95% of them. Among the many reasons given in explanation of this edema, that of obstruction to the returned circulation has received the most credence. It was Graefe's idea. The edema in and about the nerve are explainable on the grounds of the intercommunicability of the spaces between the membranes covering both the brain and the optic nerve, as the latter membranes are but a continuation of the former serving the nerve as sheaths that extend even unto its entrance to the sclera.

The prognosis, in cases such as this, where the edema papillaris is due to pressure, is distinctly dependent upon the cause and its amenability to treatment, as well as on the time of its duration. In impaired vision, where relief is at our command, the prognosis is naturally better the earlier intervention is initiated. In malignant growths, or those more inaccessibly placed, or because of extensive metastasis, the prognosis both as to life and vision is of the worst. With the progress of disease, other symptoms, more complicated and disheartening appear, until finally death supervenes to end the tragic scene following coma, paralysis, hemorrhage, or all. With the present advance of brain surgery, cases seen early may, and have been very happily benefited. In papillitis, due to sphenoidal sinuitis much hope can be entertained owing to the ready accessibility of this sinus to surgical and medical intervention.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

BELGIAN OPHTHALMOLOGICAL SOCIETY.

November 28, 1920.

Congenital Anomalies of the Fundus of the Eye.

MARCEL DANIS read a paper upon this subject published in full in this JOURNAL, page 233.

Proliferating Chorioretinitis.

DR. DANIS read the paper published in this JOURNAL, p. 153.

Cysts of the Retina.

DR. DANIS also presented a woman aged 57 in whose right eye there were two spherical transparent tumors upon which vessels were to be seen. These tumors extended into the vitreous and showed no movement. One of them was situated on the temporal side of the papilla which it covered in part. The other was situated on the nasal side and a little below. They were regarded as two cysts of the retina.

Congenital Pigmented Structures of the Pupil.

PROF. D. VAN DUYSE, Gand, called attention to the excrescences, fringes, pads and protrusions of the pupillary margin, derived from the ectodermic pigment layer of the iris. Generally they are localized in the upper part of the pupil and are symmetric. They have an interest as evidences of atavism suggesting the erectile processes of ruminants or the operculum. They are quite distinct from acquired uveal ectropion, following iritis or in chronic glaucoma. They must also be distinguished from pigmentary deposits encroaching on the anterior surface of the iris, such as pseudocoloboma described by Cosmettatos and Fejer in 1905. In the case of Fejer the pigmented portion stood out from the surface of the stroma. This part of the iris being thicker could not be confused with thinning, the absence of the stroma, the superficial coloboma of von Ammon, partial iridermia of

Gloor and Folte. The condition is the reverse of that reported by Fejer.

Annular Dystrophy of the Cornea.

H. COPPEZ, Brussels, presented a patient aged 40 years, who had suffered for about four years with annular dystrophy of both corneas. The affection began with isolated whitish islets, which had appeared on the cornea without any inflammatory reaction and which subsequently became confluent. Actually one observes on both corneas whitish rings of which the external boundary is about 1 mm. from the corneal limbus, leaving free between a narrow zone of corneal tissue. The internal boundary corresponded almost with the pupillary margin. This ring was caused by a deposit of little crystals easily seen with the slit lamp of Gullstrand. Even in the part of the cornea which seems healthy, in front of the pupil, one discovers branching crystals. The anterior chamber seems more deep than normal, the visual acuity is normal. The appearance of the patient is most peculiar. At first sight he seems to be suffering from total leucoma with tattooing of the center. The case is very unusual. The author has not encountered a similar one in the literature.

Keratomalacia in Healthy Children Cured by Testicular Extract.

KLEEFELD, Brussels, reported that in two cases of grave keratomalacia subconjunctival injections of a glycerin extract of testicle provoked an intense congestion of the conjunctival and episcleral vessels, followed by chemosis which varied with the dose injected. The injections were used every other day, and produced an active ocular congestion persisting the day after.

Injections of pure glycerin also caused strong congestion and chemosis, but the effect is much more marked with the testicular extract. Of the two cases one presented a perfect cure except that some nebulae re-

mained. The other, arising from an ulcer caused by injury by a finger nail, resulted in preserving the integrity of other parts of the cornea.

Ocular Prothesis by Modeling.

PROF. WEEKERS, of Liege, said that the procedure for prothesis he described was born of the war. During the first years of the war it was difficult to procure a prothesis for the injured. The makers could not meet the excessive demand, could not furnish artificial eyes in series. Hence the necessity to make for each case a prothesis to measure.

The process includes first, a mould of the orbital cavity by means of paraffin melting at 40° C. This mould serves as the basis for the modeling. Next it is hollowed out by means of a bistoury giving to it the concavity necessary to assure good adhesion to the deep tissues. Third, paraffin is run on the anterior face to give the prothesis the same prominence as that of the sound eye. To arrive at this result a piece of paraffin is put in place and more is added or part is removed according to the needs of the case. Fourth, to indicate on the paraffin mould the proper position for the pupil. The model thus obtained is then reproduced in vulcanite. This model which can be kept indefinitely is sent to the maker of artificial eyes with the necessary directions concerning the color of the iris, the size of the cornea and the size of the pupil.

The results obtained are very satisfactory from the esthetic point of view, particularly in the difficult cases, where the orbital cavity is contracted or there are cicatrical bands. The procedure is more rational than the empiric method of choosing an eye from a certain assortment.

Siderosis of Crystalline Lens Without Clinical Evidence of Any Fragment of Iron.

D. VAN DUYSE of Gand, and M. DANIS of Brussels, reported this case. In a workman wounded in the eye by a splinter of cast iron they observed:

- Under the anterior capsule of the crystalline lens a circlet of nine ochre colored foci with diffuse outline com-

posed of a collection of brown dust or granules more or less concentrated. Between these foci are fine russet spots occupying the pupillary area. (Siderosis speck.)

- A few pigment spots are situated on the anterior surface of the crystalline.

- A cataract approaching maturity.

The pigment spots upon the capsule might be congenital remains or pigment of uveal or iridic origin or blood debris. The subcapsular yellow spots are those of siderosis. The reason for their grouping in star form is not clearly explained. Examination with X-rays, the giant magnet of Haab and the magnetometer of Gallemarts were negative. It is probable that the very small splinter of iron was completely transformed into a salt of iron which has no influence on the three methods of examination employed for the detection of intraocular magnetic foreign bodies.

Bordet Wassermann Blood Reaction in Ophthalmology.

RASQUIN, Namur, finds that this reaction with the blood, as ordinarily carried out, is not sufficiently sensitive for the requirements of ophthalmology. In effect it represents a test for the total activity of various syphilitic foci in the organism. The eye is a relatively small organ and does not produce a positive reaction if the ocular lesion is acute or exists without other syphilitic lesions. We must, therefore, in order to get a reaction, undertake a modified technic which will make it more sensitive. Rasquin employs the desensibilization of the serum. After having studied a series of cases the Bordet-Wassermann reaction and the reaction on the desensibilized serum he concludes that in ophthalmology the difference in the percentage of positive reactions is from 38% to 78%. He concludes his communication by reporting some observations that show the advantages of his perfected technic, which are numerous.

Action of Adrenalin in Ocular and Vascular Tension.

G. LEPLAT, Liege, read a paper on the Action of Adrenalin in Man upon

the Intraocular Tension and the Blood Pressure, both General and Retinal. Repeated successive observations on these pressures after the subcutaneous injection of $\frac{1}{2}$ milligram of adrenalin prove that the intraocular tension remains unchanged in spite of the sharp transient elevation, variable in amount, but always noticeable, of the arterial systolic pressure, both general and retinal. The latter vary similarly. The same similarity of diastolic pressure is found in the radial artery and the central artery of the retina. It rises, remains constant, or sometimes slightly diminishes. The tension in the central retinal vein appears to remain constant.

Relations Between the General and Ocular Circulations.

H. COPPEZ and J. DE MEYER, Brussels, have noted that there is a hypertension, even a great hypertension which seems normal both from the general point of view and the ocular. On the other hand there is a very slight hypertension, even in some patients no hypertension, which presents the same effect as a great hypertension, angina, tachycardia, Bright's disease, retinal hemorrhages, neuroretinitis, etc. The conditions, paradoxical at first sight, are explained if one considers a factor that should often attract attention; the amplitude of the pulse.

For the same variation in pressure the amplitude of the pulse is proportioned to the elasticity of the arterial wall becoming less as the artery is more rigid or more distended. The amplitude of the pulse is estimated by means of the sphygmoscope of de Meyer to a minimal variation. In normal subjects one obtains tracings of 12 to 15 mm. amplitude. With hypertension considerable differences exist.

These authors exhibited a series of very demonstrative tracings. With subjects suffering from high tension 270-170 mm., the amplitude varies from 12 to 1 mm. It is interesting to observe that those patients having a normal amplitude presented no ocular lesions, and that those with reduced amplitude were attacked by neuroretinitis, hem-

orrhagic glaucoma, or retinal hemorrhages.

These facts were also observed with moderate hypertension, 200 mm. mercury, and even in patients whose vascular tension was normal. The authors report a man with hypertension (160-115 mm.) with a pulse amplitude reduced to 5 mm., who suffered from numerous symptoms characteristic of hypertension and notably from retinal hemorrhages.

As concerns the eyeball one observes in applying the tonometer of Schiötz that the lever sometimes shows oscillations synchronous with the pulse—the ocular pulse. Moore has measured these oscillations in 60 patients with arteriosclerosis. He noticed that the amplitude of the oscillations diminished to the proportion of increase of vascular tension, which agrees with what is reported above. Bailliart has also reported that in chronic glaucoma the amplitude of the ocular pulse is reduced. It results therefore from these observations that the question of the amplitude of the pulse has as much significance and importance in ophthalmology as in internal pathology.

Fixation of Lids in Cataract Operation.

RUBBRECHT, Bruges, after anesthesia and preparation of the lid margins, and external canthotomy, places a loop of wire in the middle of the border of the upper lid and another in the middle of the lower lid margin, the assistant holding each of these during the operation.

Operative Treatment of Convergent Strabismus.

HOORENS, Gand, made a statistical report of 200 cases of strabismus operated upon and followed up during several years. These patients were operated on by the following different methods:

1. Unilateral tenotomy.
2. Unilateral tenotomy combined with musculocapsular advancement.
3. Double tenotomy.
4. Double muscular advancement (method of Landolt).
5. Tenotomy of the good eye.
6. Double capsulo-muscular advancement.

In strabismus of very slight degree Hoorens practises tenotomy of the healthy eye. In young patients whose recti muscles function well, and tenotomy of the deviating eye in older patients with insufficiency of the externi. For strabismus of moderate degree (20 to 30°) simple tenotomy of the amblyopic eye or tenotomy combined with capsulo-muscular advancement, and for moderate strabismus with good visual acuity, double muscular advancement.

In pronounced strabismus with the deviating eye amblyopic tenotomy is combined with musculo-capsular advancement; and in pronounced strabismus where the deviating eye has good vision, double muscular advancement. Finally, in very marked strabismus tenotomy combined with capsulo-muscular advancement, and in alternating strabismus, double muscular advancement or double tenotomy.

Deviations of the Head in Ophthalmology.

MARBAIX, Tournais, has observed such deviations in astigmatism, ocular palsies, or insufficiencies following tenotomy, ptosis, grave diseases of the brain, and nystagmus. He cited 6 cases.

1. Myopia of 2 D. in the left eye. For three months the head has been carried to the left, the eyes to the right. The left eye in adduction. This is contrary to the rule that the better eye is placed in adduction.

2. Deviation of the head to the right and both eyes to the left in connection with functional insufficiency of lateral movements to the right.

3. Right eye enucleated at the age of 18 months. Left eye in adduction, head to the left thru preponderance of the internal rectus over the external rectus.

4. Amblyopia of the right eye. The left eye, very hyperopic, is in adduction. The head turned to the left. After atropinization and correction of the hyperopia the head is held straight.

5 and 6. Lateral deviation of the head in nystagmus and good vision. The nystagmus is almost arrested by convergence. For distance the devia-

tion of the head and adduction of the eyes. With one of these patients the wearing of prisms of 10° apex to the nose allowed keeping of the head straight in nystagmus.

MARCEL DANIS.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNOLOGY.

December 14, 1920.

DR. J. B. BLUE, presiding.

Patients Operated on for Entropion.

DR. ELLETT showed a patient upon whom an operation for entropion had been performed November 9, 1920. Woman, age 42, with a history of sore eyes as long as she could remember. She showed the scars of trachoma, with entropion of both upper lids, pannus and a small corneal ulcer left eye. Vision was, right 18/200; left 5/200. Beard's "Altogether Operation" was done; intermarginal incision, canthoplasty, Hotz operation and a mucous graft from the lip between the edges of the intermarginal incision. Neither graft took, but the result is nevertheless very good. Vision in the left eye has improved to 10/200.

Dr. Ellett showed a patient upon whom he had operated for entropion; man, age 37. He had had inflammation of his eyes for about ten years. He presented the usual picture of chronic trachoma with slight entropion. The corneas, especially the left, were roughened and the vision reduced. The Hotz operation was done on both upper lids, November 16, under a general anesthetic. There has been a corneal ulcer in the right eye since the operation, but it is now healed and the patient is comfortable.

Coloboma of Iris, Choroid and Optic Nerve.

DR. ELLETT showed a patient with coloboma of the iris, choroid and optic nerve, right eye. Mrs. F., age 39, has always had poor vision in right eye, 2/200. L, 20/100. The left eye seems to have no other trouble than an error of refraction, but there is nystagmus

in both eyes. The right eye shows a coloboma of the iris to the periphery, down and a little in. The eye ground shows a large coloboma of the choroid, involving the optic nerve. The edges are lined with pigment deposits around the upper end of the defect, similar in distribution to the pigment changes in retinitis pigmentosa.

Interstitial Keratitis.

DR. ELLETT showed the son of the patient with coloboma of the iris, choroid and optic nerve, age 14, whom he had seen with interstitial keratitis 11 years ago. He also had a convergent squint, the left eye turning in 27° . This is said to have followed measles at two years. Treatment was not followed, tho there have been several prescriptions and also general treatment. Both corneas are quite opaque. Vision 20/50 and 10/200.

Retinal Hemorrhages.

DR. FAGIN presented a case of a retinal hemorrhage. Man, aged 22, a senior medical student, who had had seven retinal hemorrhages in left eye. The first hemorrhage occurred August 17, 1920; the others September 30, October 15, November 1, November 11, November 26, December 7. Different retinal vessels have been involved, both nasal and temporal, extremely peripheral in all instances. Sufficient in size to blur the vision to counting fingers. They soon clear and vision becomes good again.

DISCUSSION. Dr. Ellett said that the important thing here was to ascertain the cause, and remarked that influenza and tuberculosis were the commonest causes of hemorrhage.

Dr. Stanford said that he had seen the case with an obscured vitreous and thought it tuberculosis.

Dr. Fagin also showed a man 37 who had two hemorrhages, the first October 11, 1920, and the other November 27, left eye. Everything had been done to determine the cause of the hemorrhages, without result. Dr. Ellett did not agree that it was a case of hemorrhage.

Rupture of Choroid and Retina.

DR. BLUE presented a case of rupture

of the choroid and retina in a carpenter, age 40, who while driving a nail on September 23, 1920, was struck in the right eye by the nail. There was great pain and immediate dimness of vision, which continued some time. The vision has improved in the last two months. Vision now 20/70. The remaining evidence of the injury is a linear corneal scar to the temporal side, about 2 mm. from the limbus, and a vertical linear tear in the fundus at the outer side of the macula. This tear seems to have been in the choroid and the retina.

DISCUSSION. Dr. Ellett thought the tear confined to the choroid, as he saw the retinal vessels pass over the tear.

Dr. Stanford thought the retina and choroid each torn.

EDWIN D. WATKINS, Secretary.

BUFFALO OPHTHALMOLOGIC CLUB.

December 9, 1920.

DR. RINGUEBERG, presiding.

A New Retinoscope.

DR. BENNETT described an original retinoscope in which the concave mirror was produced by silvering the convex surface of a plano-convex lens of one diopter, the plus one diopter lens being for the use of a presbyopic examiner. (To be published in this JOURNAL.)

Hysterical Blindness.

DR. PARK LEWIS reported a rather unusual case of hysterical blindness. A young man 22 years of age got a foreign body in one eye. It caused him some annoyance for two days, and suddenly while engaged in his work as an accountant he became blind in both eyes, so much so that he had to be led to the office. A cinder was found in the left eye, which had undoubtedly focussed his attention upon his sight. The boy was unable to distinguish light, but said he saw black streaks like pencils before his eyes. He had been in the army and was severely shaken up nervously. On being reassured, he was much better in twenty-four hours and had entirely recovered in thirty-six hours.

Exophthalmos.

DR. ARRELL referred to a patient exhibited at a previous meeting, in which there was paralysis of the sympathetic with slight exophthalmos. Dr. Park Lewis had suggested the diagnosis of Graves' disease and advised that a basal metabolism test be made. This was done shortly afterward. The metabolism was found normal. Dr. Cowper suggested that another metabolism test be made, as conditions vary from time to time. The photograph of the patient was exhibited.

Retinal Hemorrhage.

DR. ARRELL also reported this case. A young woman 20 years of age, a nurse in the City Hospital in Hamilton, suddenly became blind in the right eye from retinal hemorrhage. Later she suddenly became blind in the left eye from the same cause. Vision in the left eye was reduced to 10/200. In October she had an acute attack of appendicitis. Upon operation some grape seeds were found in the appendix. The only physical abnormality found was an enlargement of the posterior portion of both inferior turbinals. Since the operation for appendicitis she has improved very much.

DISCUSSION. Dr. Park Lewis said that most interesting work had been done by DeNiord on the blood, in the determination of focal infection. The conclusion reached by him was that if the blood analysis shows an excess of uric acid and nitrogen urea with a deficiency of adrenalin, no other cause being assignable, we can be assured that there is somewhere in the system a focal infection. Dr. Lewis referred to his own studies in retinal hemorrhages, in which he reached the conclusion that they were practically always dependent upon lysis of the retinal vessels rather than high blood pressure, even when syphilis and tuberculosis were present.

Iritis.

DR. PARK LEWIS reported two cases of iritis in patients who had been handling cows with inflammation of the eyes. There had been no opportunity to have bacteriologic tests made, but

it would be worth while to have such investigation made if further opportunities of like character should arise.

Lenticonus Posterior.

A Case of Lenticonus Posterior was reported for Dr. Clemesha by Dr. Blaauw.

DISCUSSION. Dr. Blaauw said: I have had the pleasure of seeing Dr. Clemesha's patient, a boy of about 12 years. When we first saw him about a year ago the diagnosis of posterior lenticonus was made. The picture was identical with the one in de Schweinitz's Textbook, and in the American Encyclopedia of Ophthalmology. I do not remember how the reflex of the posterior capsule was, but a luminous disc in the center of the papilla was seen, which was sharply limited by a dark border and the red periphery. The disc could be compared with an "oil drop"; it was, however, not absolutely transparent. Late-ly we have been able to see the lens with the slit-lamp. The "oil drop" stood out as a very sharply confined globe, with "riders" which showed a radial position, the thicker part outwardly. The impression with the slit-lamp was not of a membrane, but of a rather sudden transition of refraction as observed in the nucleus of older people.

From many sides this lens condition is highly interesting. It gives the impression of a pathologic condition, sharply limited to the embryonal nucleus. He referred to the beautiful investigations of Prof. A. Vogt (Basel), who has shown the persistence of this embryonal nucleus during life; its vulnerability at the time of its formation can be demonstrated by the presence of the anterior axial embryonal cataract, so often found with the slit-lamp. He also mentioned Vogt's investigations of the remains of the hyaloid artery, which remain visible during life. Their place is at the nasal side of the posterior lens capsule, not at the pole, so that the theory of lenticonus being produced thru traction at the posterior pole cannot be strictly correct. It will be seen that with our

newer methods of investigating lens-conditions, the chapter on "lenticonus" posterior probably will have to be revised. The cases will have to be divided into:

1. The typical lenticonus posterior (bulging out of the lens).

2. The cases of the "oil drop," where the embryonal nucleus is pathologically developed.

In answer to the question, how deep into the eye can one look with this lamp, Dr. Blaauw said that he had seen the anterior part of the vitreous. Koeppe sees the fundus, the optic nerve and the retina with special precautions.

Dr. Bennett recalled an article by Darier published some 20 years ago, where by the use of a minus lens, endoscopic images of lens opacities were brought into view. The commonest shape of these was in the Y-form. Dr. Starr said that a plus 10 D. lens will give the same effect.

H. W. COWPER, Secretary.

CHICAGO OPHTHALMOLOGI- CAL SOCIETY.

November 15, 1920.

President, DR. ALFRED N. MURRAY.

Retinitis Pigmentosa.

DR. GEORGE F. SUKER reported the case of Mr. R. A. P., who consulted him in July, 1914, then aged 53, on account of failing vision for near work. Family history negative, as to consanguinity and syphilis, for many generations back. Physical examination of patient negative as to syphilis, tuberculosis, rheumatism and gout. He had the usual diseases of childhood, and had not been sick for years since. Never had any eye trouble needing attention (patient's remark) excepting glasses for near work.

Upon examination July 20, 1914:

O. D. 20/20 — 0.75=20/16.

O. S. 20/30 + 0.75=20/16.

Accepts for near point + 2.50 for each eye.

Fundus examination shows typical retinitis pigmentosa, spots in each eye limited to the nasal half of each ret-

ina. The temporal half of each retina absolutely free from pigment spots and no suspicion of any chorio-retinal lesion. The pigment spots came up to the median line above and below and occupied the outer one-third of the periphery of each nasal retina. Each optic nerve absolutely normal as to color and vascularization. The characteristic waxy color of the disc definitely and distinctly absent.

The vitreous was free from any kind of opacities; lens normal; iris reactions normal. The field of vision for each eye showed in temporal field large, almost coalescing scotomata, a temporal hemianopsia. Form and color fields restricted in temporal field to about 35, and to about 45 in nasal field of each eye.

Patient stated that he never could see well at night, and did not now. Night vision was not any worse than it was 40 years ago. He was wearing +1.50, each eye, when examined, and now accepted in each eye +2.50. No treatment was deemed advisable and none given. Patient returned in October, 1920, for change in lenses. Examination showed O. D. 20/30 + 1.00=20/16; O. S. 20/40+1.25=20/16 and +4.00 each eye for near point.

There now were typical pigment spots in the temporal half of each retina, thus giving a complete circle of pigment spots. This circle of pigment did not encroach any further towards the optic nerve than did the pigment on the nasal side in 1914. Again the disc did not show any waxy appearance. The balance of the retina was not involved, the choroid showed no pathology whatsoever, and the media were clear. The field of vision for each eye showed the same type of scotomata as did the temporal field in 1914, and they coalesced in about the same manner.

The fields taken in 1920 do show that contraction has progressed slowly. No treatment of any kind was ordered.

The interesting features in this case are:

1. Absence of any of the usual supposed causes for retinitis pigmentosa.
2. The involvement of one-half of

each retina for years (some 50 odd) before the other half became similarly involved.

3. The absence of the classic waxy discs.

4. The retention for years of normal vision.

5. The relatively little annoyance caused by the nyctalopia and the symmetrically contracted visual fields—patient thinking himself normal except for nyctalopia.

DISCUSSION. Dr. Michael Goldenburg had never seen a case where the vision did not gradually decrease. The socalled improvement seen when one tries to treat these cases was, in his opinion, purely psychic. If sufficient enthusiasm was manifested by the doctor and sufficient armamentarium resorted to, improvement would result, but only mental. Cases would remain stationary only for a comparatively short time.

He believed that retinitis pigmentosa was a congenital defect. He was inclined to think that it was present, or the factor or factors that resulted in this condition, were present at birth. He had invariably found other congenital defects associated in these cases, e. g., stationary opacities of the lens and vitreous, coloboma of the lens, deaf mutism, and in one case he recalled the presence of polydactylism. The fact that it was not recognized early in life was due to our method of examination of children. He recalled one case of chorio-retinitis where the proliferation of pigment epithelium assumed the bone corpuscle form and was anterior to the retinal vessels, and limited to the periphery of the field, but only on one side. This case was under observation and discussion for some time and was eventually proven to be syphilitic.

Retinitis pigmentosa is a degeneration of the nerve fiber layer of the retina, with proliferation of pigment epithelium. The findings invariably were a narrowing and straightening out of the vessels, particularly the arteries. The bone corpuscle pigment deposits anterior to the vessels and the so-called waxy appearance of the disc were

referred to by the Germans as a retinitic optic atrophy.

He would be very suspicious whether this was a case of retinitis pigmentosa, regardless of the pigmentation. The waxy appearance of the disc was important. The contraction was indefinite. The pigment epithelium proliferated usually at the periphery. The contraction of the field began at the periphery, as did degenerations. As to consanguinity, he had never been able to trace a single case where he could say it was the etiologic factor. Dr. Gamble presented such a series before the society some time ago.

Dr. Francis Lane stated that the classic anatomic description of retinitis pigmentosa was that the tissue of election was the choroid. That theory was held for a good many years, but recently it had been advanced that the primary lesion was a degeneration of the rods and cones. He was very glad that Dr. Suker laid stress on the fact that the primary lesion was in the retina.

The proliferation of the pigment in typical cases began at the equatorial region. This was the location where the pigment epithelium of the choroid was first developed. The macula lutea was the last place involved in retinitis pigmentosa. There must be a degeneration of the rods and cones before the peripheric pigment could migrate into the retina, because the outward limiting membrane was more or less of a closed membrane. It was possible the first rods and cones that were developed were those at the equatorial region, because as the eyeball developed, the rods and cones developed more toward the central region.

There was not any satisfactory explanation for the nyctalopia, with this exception, that the changes took place in the retina, where the eye was most susceptible to light, in the region of five to twenty-five degrees from the posterior pole. He did not think it was very difficult to separate those cases where the vessels were involved. He had specimens that showed where there was a sclerosis of the choroidal vessels. If the pigment migrated from

any inflammatory process, it was always heaped up. It was not the fine, feathery arrangement one found in retinitis pigmentosa. The changes in the choroid from degeneration and from any inflammation showed a different picture.

Dr. Thomas Faith stated that Dr. Suker's hypothesis of the endocrine disturbance seemed to be supported by the spotted pigmentation of the skin, which occurred with hypoadrenia. The similarity in the development of the structures of the retina and the structures of the skin would lend some support to the idea that the disturbance might be thru either. What one was at fault primarily, no one could say, because they worked together.

Dr. Suker, in closing, stated that in many of these pigmentosa cases it was difficult to say whether or not the pituitary gland or some other endocrine gland might be held responsible for a certain amount of changes. He had come to the conclusion some were. If one examined the retinitis pigmentosa cases from a general viewpoint he would find some disturbances which could be analyzed as having some pathology based upon an endocrine gland disturbance. They presented either hyper- or hypopituitary or hyper- or hypothyroidism, or hyper- or hyposuprarenal activities and changes. One had the skin disturbance as manifested by the scaly skin and also the myxedematous symptoms, such as swollen face and hands and other symptoms allied to myxedema or acromegaly in a modified type. In the case cited he found disturbances that were akin to those brought about because of faulty activity in that gland. He had always held the opinion that it was a purely retinal disease and not secondary to some form of choroiditis.

As far as attenuation of the vessels was concerned, that was a secondary manifestation because of the development of the pigment upon them and a subsequent fibrosis. One would find in the majority of these individuals an element of vessel sclerosis, in a measure due to the direct contraction influence exerted by the pigment. The at-

tenuation and the light streak along these vessels gave a relatively narrow vessel appearance. Unless one had associated disease of the cardiovascular system, the retinal vessels were scarcely ever tortuous. Arteriosclerosis manifested itself usually first in the end arteries, of which the retinal vessels were a typical example.

He was glad that Dr. Goldenburg brought up the question of consanguinity rather ironically. The endocrine glands of the lower animals did not correspond to the gland of the human in every detail by any means, except in the matter of shape. The thyroid of the dog was not physiologically the same as that of a man; nor that of an ox the same as that of a dog. They had characteristics peculiar to their own species. Even the thyroid or the pituitary gland of a negro was not exactly the same as that of a white man in its functions. He had never seen retinitis pigmentosa in a negro. There was not a case on record as far as he was aware.

Microscopy of Living Eye With the Slitlamp.

DR. ROBERT VON DER HEYDT read the paper published in full on page 171 of this JOURNAL.

DISCUSSION. Dr. Michael Goldenburg said: Examination of the limbus, its circulation, the transition from sclera to cornea, was quite a revelation. The view of the iris disclosed by this instrument was probably the most fascinating picture ever seen. The mosaic-like arrangement of the pigment, like the fibers, the crypts, the contraction and dilatation of the pupil were well worth going a long way to see. The ability to see the microscopic details, both normal and abnormal, in the living was unquestionably an epoch-making step in ophthalmology. Unfortunately, one was compelled to the conclusion that this instrument would not become very popular. It was very large, therefore could not be transported readily, and it was expensive. He was inclined to think that it would be almost limited to large clinics or large institutions, or to men who had plenty of space and time to do original work.

Dr. William A. Fisher stated that the instrument must appear complicated to others as it did to him, but it might appear very simple and practical when one knew how to use it.

Dr. George F. Suker concurred in what Drs. Fisher and Goldenburg said about this instrument. The essayist had opened up a large field. One in particular, when he spoke of the droplets in the anterior chamber producing a secondary glaucoma. These droplets undoubtedly were from a colloidal substance. If that was so, then Martin Fischer's (Cincinnati) theory was not so far afield, and acidosis could be an etiologic factor in glaucoma. Closer study of these particular droplets might determine whether they were composed of crystallizable or amorphous elements. Martin Fischer's salt solutions might, after all, be of greater value in these cases than was formerly believed.

Dr. von der Heydt, in closing, stated that in the first place, with the slit-lamp a definite, continuous circulation of the aqueous within the anterior chamber might be demonstrated. The solids might be observed to rise near the warm iris, and were precipitated near the cornea. It had been determined that the lines of socalled clearing, in old corneal scars continued to widen and increase during life, contrary to the common impression that in time the process would come to a standstill.

Recently he saw under slitlamp illumination an eye from which he had removed a senile cataract three years ago. It was beautiful to so distinctly see the clear membrane, holding back the vitreous, the supporting structure of the latter, and the very deep apparently optically empty space between the iris and its membrane. At one small opening the vitreous extended hernia-like forward toward the iris.

He would like to see one of the types of transient lens changes, such as were seen to exist for a short period after trauma, with the slitlamp. He had reference to that beautiful hexagonal, feather-like formation, apparently under the posterior capsule, seen after a blow, if there had not been too much hemorrhage to obscure the view. This

change, as well as the very interesting macular changes after trauma, including wrinkling of the retina, were so often overlooked. The circular ring on the lens capsule, first described by Vossius, and thought to be a lens clouding, which also followed trauma, had been studied by the slitlamp. It had been ascertained that the ring was mainly composed of blood derivatives and iris pigment, macerated on the anterior lens. To see this ring it was necessary to dilate the pupil.

Two days ago he had a foreign body case, a spicule of iron went thru the cornea and iris and lodged deeply within the lens. By the ordinary method of focal illumination with the ophthalmoscope he was unable to see the steel, because of the dense lens clouding anterior to it. With the slit-lamp and microscope, and the intense illumination, he could easily see thru the clouded lens substance. Consequently, before he removed it, he was able to localize exactly the steel, determine its size, save much valuable time and the expense of a roentgenogram.

Obstruction of Retinal Vessels.

DR. JACOB LIFSHUTZ reported the following case:

The patient, a young colored man, aged 21, came to the eye clinic of the Postgraduate Hospital on the 13th of November. He stated that sight began to fail in his right eye eight days prior to admission. He never had had any pain before, inflammation, or any other trouble in either eye. On examination the left eye was found normal in every way, vision being 20/20. The right eye had only 20/100 vision and on ophthalmoscopic examination presented the following findings: 1. A large veil-like floater in the vitreous. 2. A little above and to the temporal side of the disc, which was normal, was an area of central choroiditis, almost the size of the disc. 3. Directly above this area was an occluded retina vessel, which appeared like a white streak with some proliferation of connective tissue from it, showing a beginning of retinitis proliferans. 4. In the macular area there was the typical cherry red spot characteristic of retinal obstruction and the area sup-

plied by the inferior temporal branch of the central retinal artery was pale and bloodless, showing the presence of an obstruction in that vessel. There was no history of lues, and no Wassermann was taken. Nevertheless this was unquestionably a case of syphilis producing an interesting variety of pathologic lesions in one eye.

Double Cataract Operation.

DR. WILLIAM A. FISHER presented Mrs. E., aged 76, for whom he operated on both eyes for senile cataract sixteen days ago. Both eyes were bandaged nine days. She had not had any postoperative inflammation, both eyes were free from irritation, and her vision was 20/50 in each eye with a + 10. Her vision would naturally improve, and if it did not reach normal, the cause would not be faulty operation. The case was presented to elicit discussion that might prove helpful. Textbooks did not recommend the double operation; but most of the objections were made by operators of long ago. There were many advantages in certain cases and few disadvantages. Those who did not believe in it saw many disadvantages, while those who thought well of it saw few disadvantages. He saw many cases which he believed would have many advantages by having both eyes operated at the same time.

He had operated a large number in this manner and did not believe they had any more complications than those operated one eye at a time. The greatest objections to the double operation naturally came from those who had never operated in that manner. If the double operation could now be done without more complications than singly, it seemed to him that it should be the operation of choice in selected cases.

DISCUSSION. Dr. R. J. Tivnen stated that what the patient wanted and what was safe to give him was quite a different matter. Dr. Fisher's plan of extracting both cataracts at the same sitting was entirely against all teaching and practice. It seemed to him to be against all common sense. The essayist said one could do it without

risk, but he did not think you could absolutely eliminate that possibility. Dr. Fisher said he did not have infection because he used a new set of instruments for the second eye. A new set of instruments would hardly, by any stretch of one's imagination, entirely eliminate the possibility of infection. Infection might come from within, endogenous, as well as be introduced. In addition, it was to be remembered that the same operator, the same assistants, the same operating room, in short, all of the usual channels of infection were present during both the operative procedures, and all were possible factors in inaugurating an infective process.

No one, therefore, however skillful and painstaking, could possibly wholly eliminate the danger of infection under such conditions; and if infection did occur, think of the tragedy of binocular infection following the cataract extraction. Safety first, in this connection, became not only a practical slogan, but an absolute obligation on the part of the doctor in discharging his full responsibility to his patient, and his positive conviction was that operating one eye at a sitting was the sensible, practical and safest procedure.

He asked Dr. Fisher whether he performed the intracapsular operation. He understood he had done 200 on both eyes at the same time.

Dr. Adams asked as to the mental attitude of the patients. Were they as quiet with the second operation as with the first?

Dr. Fisher, in closing, said he tried to remove all senile cataracts in capsule. But in this case his needle was used in both operations and both capsules ruptured and retained, which would probably require needling. The needle, however, did not rupture all capsules. He would answer Dr. Adams' question regarding the second operation by saying he would not operate the second eye unless the patient was quiet. He had usually found the patient more quiet when operating upon the second eye than the first. He did not find many patients unruly during a cataract operation unless they were hurt. Since discarding the eye

specula and substituting lid hooks, he found the patients did not complain of any part of the operation.

When he was with Colonel Smith he operated 576 eyes and 200 of them were double. Records were kept and no more complications occurred with the 200 double than with the 376 single. If Smith had always operated as he did when he was with him, he must have operated at least 15,000 double and he believed there were no more complications doing them double than would occur operating singly. His record alone would seem to overshadow all objections.

COLORADO OPHTHALMOLOGICAL SOCIETY.

December 18, 1920.

DR. C. L. LARUE, presiding.

Uveitis of Uncertain Origin.

W. C. and W. M. BANE, Denver, presented a woman aged 43 years who on November 22, 1920, had first noticed a blurring of the vision of the right eye. A day or two later she suffered pain in the right temple, and there was marked photophobia. On November 26 the vision of the right eye was 5/10, of the left eye 5/5. The right eye was red, vitreous haze prevented a clear view of the fundus. Atropin was instilled and the pupil dilated widely. Three days later the pupil had partly contracted, and upon again dilating it an annular deposit was found on the anterior capsule of the lens. Subsequent treatment included calomel, aspirin, and locally, the instillation of atropin and the use of hot applications. It was hard to keep the pupil dilated. On December 4 the vision of the left eye was affected, and on December 7 the vision of this eye had fallen to 5/30. Mercurial inunctions twice daily were ordered, and the patient became gradually more comfortable, but the vision did not improve. An X-ray of the nasal sinuses was negative, and so was a Wassermann test. On December 16 the right tonsil showed a slight patch of exudate, culture from which was negative.

DISCUSSION. Melville Black, Denver, thought that the negative findings

would warrant an exploratory operation on the nasal sinuses.

Edward Jackson, Denver, agreed with Dr. Black, remarking that we did not hesitate to trephine for intracranial tension to avoid threatened blindness. It was impossible to be sure that the sinuses were normal, and the patient looked as tho she were in danger of blindness.

W. C. Finnoff, Denver: At the meeting of the American Medical Association somebody put it very well when he said the general surgeon did not hesitate to open an abdomen for purely exploratory purposes, and that we should be just as ready to do exploratory operations upon the nose and throat to determine the presence or absence of infection.

G. F. Libby, Denver: In regard to these cases and cases of sudden blindness in which we can make no diagnosis except retrobulbar neuritis, it is a good plan to say to the patient that many years ago such a case would have been hopeless, but that our present knowledge of focal infection opens up a prospect of cure in many instances; altho after we have done an exploratory operation we may fail to obtain relief.

Lens Dislocation.

W. C. and W. M. BANE, Denver, presented a man aged 24 years who gave a history of having on August 5, 1920, received a severe blow on the back of his head and a kick in the region of the left frontal sinus and left side of the bridge of the nose; and who stated that three days later he had noticed that he could not read small print with either eye, and that the distant vision of the left eye was more blurred than that of the right. There had also been a tendency of the left eye to turn outward. The vision of each eye was 5/30, improved to 5/20 with about — 15 D. sph. Both lenses were dislocated downward. The question was raised as to whether the dislocation of the lenses was possibly due to the injury which the patient was said to have received.

E. F. CONANT, Denver, presented a man aged 43 years, who on November 3, 1920, had received a violent blow on

the left eye with a champagne cork. There had been an immediate effusion of blood into the anterior chamber and vitreous. There was some apparent exophthalmus, with a good deal of ecchymosis of the lids. A dark purplish area in the sclera, from 3 to 5 mm., above the upper margin of the cornea, suggested a probable rupture of the sclera. At the time of demonstration the upper part of the iris had disappeared, being displaced upward beneath the sclera. There were brown spots on the anterior surface of the lens, and opacities in the vitreous. The right eye showed scars of an old chorioiditis, and the vision of this eye was 20/200, unimproved with a lens. The vision of the left eye was 20/100, improved to 18/50 plus with +2.50 sph. — 7 cyl. ax. 45°.

DISCUSSION: Melville Black, Denver, thought that the condition in Dr. Bane's case was congenital, from the appearance of a double coloboma in the right lens. There was an apparently opaque strip along the edge of one of the colobomas, but this opacity seemed to be a refractive condition.

Edward Jackson, Denver. In this case there is no sign of injury of the external coats of the eyes. There is also a coloboma in the left as well as the right eye. When I first looked at these eyes, I thought that the condition must be congenital. Then I studied Dr. Conant's patient, in whom there can be no question as to injury having caused the disturbance. This man also has a reentering crescent at the upper outer edge of the lens. In this case therefore we have a subluxation of the lens, which has been followed by some absorption at the lens margin. This shakes my diagnosis in Dr. Bane's case, for the same appearance is present in both patients, except that in Dr. Bane's case there is no general opacity of the lens.

W. H. Crisp, Denver, thought that the absence of any external scar, the fact that both eyes were affected almost equally, and the absence of any evidence pointing to a direct blow upon the eyeball, were against the traumatic explanation of Dr. Bane's case.

Dr. Jackson. There have been well established reports of bilateral rupture of the lens at the time of hanging; and such rupture probably occurs in the majority of cases of hanging.

W. C. Finnoff, Denver. The war has brought out a number of injuries to the eye which resulted from head injuries remote from the eye. These indirect ocular injuries include subluxation of the lens. One writer explains this as due to contrecoup.

Epithelioma of the Lid Margin.

W. C. and W. M. Bane, Denver, presented a man aged 62 years who had come complaining that for the past three or four months the right eye had been bloodshot and there had been a small ulcerated area a little to the other side of the center of the edge of the right lower lid. This ulcerated area had taken the place of a small wart which had been there until about three months previously. The ulcer was about an eighth of an inch in diameter, and the underlying tissues were thickened.

DISCUSSION. Melville Black, Denver. This is probably an epithelioma. These cases are very easily managed. The indurated portion of the lid should be thoroly curetted, and then touched with trichloracetic acid. I first learned this from Dr. A. J. Markley. The result is very satisfactory.

Edward Jackson, Denver. There is very little doubt that this is an epithelioma, but the question arises whether it cannot be treated with less scarring by means of radium.

C. E. Walker, Denver. I have lately been in the habit of treating these cases, not with radium, but with the X-ray, following this with a radical operation which does not leave very much scarring.

Neuroretinitis from Nasal Sinus Disease.

W. C. Finnoff, Denver, presented a woman aged 44 years who during the past year had had a number of attacks of transitory blindness, which had been much more frequent since August last. She had had headaches all her life, and they had not recently increased in severity. She had been first

seen by Dr. Melville Black at the clinic on October 1, 1920, when the vision was R. 6-12ths, L. 6-60ths, and the nerve heads were swollen seven diopters. A Wassermann test was questionably positive. Another Wassermann test following provocative treatment was negative. Negative reports were also obtained as regards the urine, the spinal fluid, and the internal, neurologic, and nasal conditions. Neoarsphenamin, mercury, and iodides were pushed, but no improvement occurred.

When the patient was first seen by Dr. Finnoff at the County hospital, she could give no information regarding her previous condition, and all the examinations were repeated and the same results obtained. Three teeth were found to have root abscesses, but no improvement followed their removal. The vision on December 3, 1920, was R. 5-30ths, L. 5-60ths. The attacks of transitory blindness lasted about five minutes and occurred at about twenty minute intervals. The posterior ethmoid cells had been curetted on December 7, altho the operation was incomplete on account of profuse bleeding. There was slight improvement of vision following this operation.

On December 11 the posterior ethmoids were opened, but the sphenoidal aperture could not be found. After this second operation the vision improved very greatly, having in twenty-four hours reached R. 5-10ths, L. 5-12ths. The vision had remained good until three days before the date of demonstration, when the attacks of transitory blindness recurred. They were, however, not so frequent nor so lengthy as formerly, and there had been marked improvement in the swelling of the nerve heads.

DISCUSSION: Melville Black, Denver. The nerve heads in this case were like two great mounds. I had insisted on nasal operation, but the rhinologist demanded that everything should be done at the patient's own risk, and frightened her. The very remarkable improvement which has taken place certainly warrants the absolute completion of the operative procedure in

the nose. I recently had a similar case (altho there was not so much swelling of the discs), in which remarkable improvement followed cleaning out of the nasal sinuses. The improvement in this latter case is still going on, altho the operation was done a month ago.

W. A. Sedwick, Denver. The mere pulling of teeth is in many instances not sufficient. The sockets need to be cleaned out.

Dr. Finnoff. We have to be very guarded in our prognosis in these cases. I saw in the army a case in which a remarkable cure had been reported after opening of the sinuses. We saw the case again a year or so later with a return of the choked discs, and the patient died about six months later, when a postmortem examination showed a good-sized tumor in one of the silent areas of the brain.

Sliding Conjunctival Flap for Extensive Corneal Wound.

G. L. Strader, Cheyenne, Wyoming, presented a man whose right eye had, on November 24, 1920, received an irregular corneal wound about 12 mm. long, extending from the middle of the lower outer quadrant to about one o'clock, just inside the limbus. There was a large iris prolapse, and the lens was cataractous. A very large conjunctival flap was dissected loose from the upper half of the eyeball, and stitches were placed at either end of the flap. The lens was then expressed, and the sliding conjunctival flap was pulled down by means of the two stitches until it covered nearly the entire cornea.

The bandage over both eyes was sealed with collodion, and was not removed until the eighth day, the patient being perfectly comfortable in the meantime. When the stitches were removed the wound was found to be healed thruout its entire length. The vision at the date of report was 20-200ths with +10.D. sph. Among the advantages of the use of the sliding conjunctival flap in this class of cases was the fact that as the anterior chamber refilled the prolapsed iris was pulled out of the wound, making cutting off of the prolapse unnecessary.

DISCUSSION: E. R. Neeper, Colorado Springs. About a year ago I had a case in which a bottle of ammoniated water exploded and cut the cornea. The iris was slightly incarcerated in the wound. On the second day I made a small incision and released the iris and the iris remained free and the pupil entirely round.

Retrobulbar Neuritis; Multiple Focal Infection.

D. A. Strickler, Denver, presented a woman aged 25 years who on December 15 had complained that for the last few days the right eye had seemed as tho a "scum were over it." At that time the corrected vision was R. 20-50ths, L. 20-20ths. The margins of the right optic disc were indefinite, and the retinal veins distended, and there was a slight swelling in the macular region. On December 17 the right vision was 20-200ths, unimproved.

The patient had had rheumatism every winter for the past five or six years, with the exception of the present winter. Ten teeth had been removed in December, 1918, but the teeth had never been X-rayed. Attacks of tonsillitis had occurred from time to time. There was a discharge from the left nostril and from the throat.

A supplemental report stated that on December 20 X-ray examination indicated root infection of a number of the remaining teeth, especially of the first upper left molar. The shadow of the left maxillary sinus was abnormal in density, as was that of the anterior ethmoid cells beneath the left orbit. On December 21 all the upper teeth were removed, and the left maxillary sinus was found full of foul pus, which was washed out. Before the operation on the teeth and the antrum the vision of this eye had fallen to the bare perception of a hand held in front of the eye. Shortly after opening the antrum the vision returned to 20-200ths, but the fundus appearance was about the same and the vision still fluctuated more or less from day to day. Further work on the nasal sinuses was intended.

DISCUSSION: W. C. Bane, Denver. In examining the fundus I did not find any swelling of the optic disc. The

veins are larger than normal, and the disc appears to me paler than normal.

Melville Black, Denver. Examination of this case is not complete until a very careful field chart has been made with the campimeter.

Wm. H. CRISP,
Secretary.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

Meeting of December 10, 1920.

DR. JAMES TAYLOR, President.

Optic Atrophy with Leontiasis.

MR. N. BISHOP HARMAN showed a patient the subject of leontiasis ossea, unilateral, associated with optic atrophy. The skiagrams he exhibited showed that the thickening of bone was rather diffuse. The girl had been under observation 2½ years, and the only noticeable change during that time was a slight proptosis of the right eye. The optic atrophy, however, was on the increase. There was now a slight perception of light in the nasal and temporal fields, but the sight had practically gone.

DISCUSSION: Mr. E. H. E. Stack (Bristol) spoke of a case he had in 1900, the leontiasis affecting the whole head. It had been slowly growing 21 years. He secured half the skull after death, and the noticeable feature was that none of the foramina at the base of the skull were even slightly affected, altho vault and face were greatly involved in the change. It was a diffuse bossy leontiasis. At one spot the skull bone was 3 inches thick. There was no interference with brain or nerve function. During visits to a department of the hospital it had been assumed to be a case of hydrocephalus. Death eventually took place from diphtheria. Her head had become so enormous that her forefingers had become dislocated outwards from continually supporting the head, which was her usual resting attitude.

The president considered the special interest of the case was the optic atrophy. He remembered only one similar case, that of a gentleman he saw 12 years ago, who used to come to London every year to procure a

larger hat. The subject felt the increasing weight of his head. He was also deformed in certain other ways. He had no headache or optic atrophy; the latter he considered a rare complication.

A New Scotometer.

MR. HARMAN also demonstrated a new scotometer, the chief features of which were the taking of a record on carbon paper, the speed and accuracy with which it could be done, and the hiding of the observer's hand from the patient. Successive observations could be taken on the same chart, which extended 26° laterally, and 17° vertically, each way.

Frame for Hyperphoria.

He showed, in addition, a frame with vertical adjustment for use in observations on hyperphoria. He said that in certain cases which had unequal eyes there was a false hyperphoria, due to the prismatic action of lenses, which it was difficult to correct for near vision. In this apparatus, one limb was detached from the frame and connected by a telescopic arrangement with a rack-and-pinion, enabling one cell to be shifted above the other. There was a range of 10 mm., enough to give correction for ordinary hyperphoria.

Peter's Campimeter.

MR. W. H. McMULLEN exhibited a Peter's campimeter, which he described. The obvious criticism was the very short working distance, and the fact that the field marked out was in the observation of the patient. There were some cases in which it might be useful.

Leprosy of the Conjunctiva.

MR. H. NEAME showed a case of leprosy involving the conjunctiva. He said it was a rare kind of case: the last he could find recorded in England were two by Mr. Treacher Collins in 1909, reported in the Transactions of the Ophthalmological Society. The patients were father and son, aged respectively 45 and 15, of Polish nationality, tho the father had left that country twenty years before, and had noticed nothing amiss with his eye until five years before being seen by Mr. Collins.

The boy had had it only two years, and his condition was much more severe. The infection of the patient now being shown occurred in India, and the first indication of the disease was the occurrence of spots on the forearm. He had now a widely extended eruption over the body. The pupils were fixed, the knee jerks brisk. The voice indicated the presence of a degree of nasal obstruction, and there was a sanguous nasal discharge from the ulcerated nasal mucous membrane. In this discharge lepra bacilli were very numerous. The lids and surrounding skin were infiltrated and edematous. Vision in the right eye was 6/18, improved with a sphere to 6/12; left 6/36, improved to 6/18. There was no improvement with cylinders.

The patient had had eight intravenous injections of sodium morrhuate, but without producing any apparent reaction or improvement. Then he had injections of sodium chaulmoograte intravenously, as used by Sir Leonard Rogers, from 1 c.c. to 4 c.c. After a somewhat large injection he had a vigorous reaction two days later. Rogers had a series of very hopeful results from this treatment, especially in leprosy of three years' standing or less. The drug was supposed to act by the bacilli, in forming their capsule, absorbing some of the fatty acid, which was inimical to the bacilli's growth. He was continuing the treatment; the patient himself considered there was improvement.

DISCUSSION: Mr. Treacher Collins spoke of a case in a man from Rangoon, who had a completely opaque cornea on one side, and parenchymatous keratitis on the other, and he was beginning to get nodules on the sclero-corneal margin. Peritomy had been done in his first eye, and the patient thought progress of the disease was delayed by it. The speaker, at the patient's request, did peritomy in the other eye, but it did not make any difference. It was easy to diagnose ocular leprosy from the clinical appearances. Another case was in a boy from Cork, who probably caught it from his father, who had been living in Riga.

Mr. M. S. Mayou said the nasal mucous membrane seemed to be nearly always involved, and cultures from that revealed bacilli in plenty. There was no need to excise a piece of conjunctiva in order to make the diagnosis.

The case was also discussed by Mr. Gray Clegg, Mr. Leslie Paton, and Mr. Traquair.

Implantation Cyst of Iris.

MR. HINE exhibited a patient with an implantation cyst of the iris. The patient, a woman, had had the cyst for 12 years. In 1908 she had a penetrating wound at the limbus of the left eye from a blow. Iridectomy was done. A month or two later she returned with a pearly looking cyst at the site, along the margin of the coloboma. With a small cylinder she had 6/6 vision in that eye, and she experienced no trouble from the cyst. Therefore he proposed to leave it alone.

MR. McMULLEN showed a case of similar nature, with an 8 years' history; and several members recorded cases in which the results of operations for these cysts had not been good.

H. DICKINSON.

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

OMAHA, NEBRASKA.

October 19, 1920.

Pathology of Canaliculus.

DR. F. W. DEAN of Council Bluffs, read a paper on pathology of the canaliculus and its repair, which appeared elsewhere in this journal, Vol. 3, p. 883, December, 1920.

Laceration of Cornea.

Dr. Harold Gifford presented a boy of 9, showing an unusual injury. A week before he was seen he had been pulling on a wire with another boy who let go of the wire, allowing the patient's own finger to strike him in the left eye. There was a clean cut of the cornea one-eighth inch long with a prolapse of iris in the scar. The lens showed a beginning traumatic cataract.

Vision was reduced to counting fingers at two inches. The eye was becoming quiet under treatment of sodium salicylat, and a dissection was to be done on the cataractous lens when the eye was quiet.

Acute Conjunctivitis Following Injury.

Dr. Harold Gifford presented a man of 40, showing an extreme degree of swelling of both lids of the right eye with pseudomembrane covering the lids and extending on the bulbar conjunctiva to the cornea all around, and several small pustules under the skin of the lids. The patient had come in two weeks before, giving a history of swelling of the lids coming on three days after something had gotten in his eye while working in the field. For the first week after he was seen the swelling of the lids was so extreme that they could be opened only a fraction of an inch. Dr. Gifford mentioned two other cases of a similar condition, one of which had come from the same neighborhood as the patient presented, all occurring in farmers, and all with similar changes forming a picture which he called "agricultural conjunctivitis." The bacteriology of the case showed a diversity of organisms, pneumococcus, xerosis bacillus and a small gram positive spore-bearing bacillus whose properties were still being worked out. None of the members present had seen a similar case.

Blepharochalasis.

DR. H. B. LEMERE reported a case of blepharochalasis in a man.

Dislocation of Lacrimal Gland.

DR. F. W. Dean reported a case of dislocation of the lacrimal gland with resulting deformity of the upper lid due to stretching. The gland was removed and the lid shortened 3/10ths of an inch with good cosmetic result.

Some oto-laryngologic cases were presented.

The second meeting, held November 30, 1920, was largely devoted to a paper by Dr. C. W. M. Poynter, professor of anatomy, University of Nebraska, reporting original work on the development and anatomy of the tonsils.

S. R. GIFFORD,
Corresponding Secretary.

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ACCOMMODATION WITH APHAKIA.

In the great majority of cases of aphakia, the eye has lost all semblance of accommodation; as it has after acquiring complete rigidity of the crystalline lens from age, or paralysis of the ciliary muscle. In rare cases after the extraction of cataract, the patient is able to read small print with the same glass as he uses to see clearly at a distance. A considerable number of these cases are now recorded in the literature, without any established theory of their mechanism.

Imagination has been exercised to construct hypotheses as to how such a result might be brought about, but observations are generally lacking as to how it actually was attained. Perhaps the cases that were fully studied out have not been reported; while those that remained not fully explained to the minds of their reporters have found their way into the literature.

The two communications referring to such cases, found elsewhere in this number, illustrate the general charac-

ter of such reports. There is need for more complete accounts of cases of this kind, at least the complete exclusion of the more obvious possible explanations for them.

It will be helpful to review briefly the ways best understood in which apparent accommodation of the aphakic eye may be brought about. In the first place by drawing a strong convex correcting lens away from the eye, the focus for rays passing thru it is brought forward, so that it acts like a stronger convex lens and focusses rays from a near point. This is something that aphakic patients often discover for themselves. A 10. D. convex lens gives standard distant vision when in the usual position about a half inch in front of the cornea; by drawing it about twenty millimeters farther from the cornea it will give equally clear perception of fine print held twelve inches away from it. Here is a very practical way for any patient to read with his distance glasses.

Second. By looking obliquely thru a strong convex lens, its effect is ma-

terially increased, more in the meridian of obliquity than in that at right angles to it, but substantially in all. Thus looking thru a +10.D. lens at an angle of 30° with its primary axis the effect of a +11. sph. \odot +3.50 cyl. is obtained, the axis of the added cylinder being parallel to the line about which the lens is rotated. In this way a patient who had standard distant vision, looking perpendicularly thru the upper part of his correcting lens, would in effect add +1 sph. \odot +3.5 cyl. ax. 180° to its strength, when he looked down 30° thru the lower part of his lens to read. Such assistance might well enable him to read Jaeger 2, or even Jaeger 1; and certainly ordinary newspaper print.

Third. What is supposed to be the correction for distance may be inaccurate. The glasses worn may be a few millimeters farther from the eye than those used in the trial frame when the eyes were tested, and thus be in effect an overcorrection. The cylinder may be inaccurate, one meridian of the lens being the proper correction for distance while the meridian perpendicular thereto is more nearly the strength required for near seeing. Aphakic eyes are apt to receive inaccurate corrections and the patients accept them because the vision they give is so much better than is obtained without.

Such corrections, to make them accurate, take a great deal of time, especially if attempted without use of the ophthalmometer. Full standard vision is not expected, as a rule. Rapid fatigue of the senile eye comes in and prevents the best vision; and the patient may prefer an overcorrection because it gives larger images. In this way what is supposed to be the lens best suited to distant vision is often a compromise between that and the one needed for near vision. A patient resolved to have the best possible operations done on his eyes, had one cataract extracted in Vienna and the other in Wiesbaden. He came back with good operative results, but with lenses that gave him vision of R. = 0.8. L. = 0.8. A change of 1 sph. \odot 1

cyl. in the right and 1 sph. \odot 0.75 cyl. in the left, gave vision 1.2 in each eye.

Fourth. The refraction may differ in different parts of the pupil. It is possible thus for the same lens to serve as a distance correction for one part of the pupil, and be adapted for near vision thru another part of the pupil. Aberration of the eye is an instance of this. The edge of the pupil may need a -2. D. lens, the center a +2. D. lens. In rare cases, under full cycloplegia, the lens may be varied as much as 2. D. in strength without bringing down the vision below standard. A presbyope, with low myopia, had a corneal facet opposite the center of his pupil. His vision was markedly improved by either a +1. D., or a -1. D. lens, over what he could get without lenses.

Marked differences of refraction between different parts of the pupil are almost universal after cataract extraction with iridectomy, being somewhat proportioned to the size of the corneal incision. Such differences make skiascopy especially difficult and unsatisfactory, after cataract extraction; sometimes a difference of from 3 to 6 D. may be observed between different parts of the clear pupil. Such differences, combined with the tendency of the patient to choose the lens which gives the larger image, very readily lead to the choosing of a lens with which both near and distant vision are possible.

Fifth. The effect of a small aperture, in giving fairly sharp images without accurate focussing, must be taken into account. The effect of the size of the pupil on the distinctness of unfocussed images needs more careful investigation. But a pupil 2 mm. in diameter lessens to a notable degree the blurring due to the defective accommodation; and with a pin hole 0.5 mm. in diameter, one can read the very finest type, within one inch of an eye that is focussed for parallel rays, thus neutralizing 40. D. of imperfect focusing.

Sixth. The power to correctly interpret images can be developed to a surprisingly high degree, enabling one

person to do what seems quite impossible to others. This is what enables the trained eye of the plainsman or sailor to recognize, at a glance, what untrained eyes of equal resolving power are quite unable to make out. It enables the myopic marksman to run up a good score without concave lenses, altho the target appears to him only as a most indefinite and inconspicuous blur.

Seventh. The refraction of the eye can be changed by external pressure on the eyeball. We know this can be done by pressure of the lids, or on the lids. This has been observed in some eyes in connection with tumors of the lids, and has been resorted to by patients for the purpose of improving their vision. It is very probable that such changes may be effected by anomalous action of the extrinsic ocular muscles. They have been reported in connection with operations on the ocular muscles. Some careful experimental work should be done in this direction, not to bolster up a theory, or to give plausibility to an alleged great discovery, or overthrow knowledge previously secured, but to get at the facts.

Eighth. The hypothesis that a part of the vitreous has a higher index of refraction than other parts and so can act as a convex lens, might be investigated, altho known facts appear to be against it. One part of the vitreous may be more firm than another, yet both have the same index of refraction; as do the solid cornea and the liquid aqueous.

It is not too much to ask when a case of apparent accommodation in an aphakic eye is observed and reported, certain facts should be observed and recorded in that report. These should include the exact refraction of the eye, its focal adjustment with regard to parallel rays; the maximum visual acuity obtainable, and the lenses with which it was obtainable at the reading distance, as well as the vision obtained at the reading distance with the "distance correction."

The corneal curvatures should be observed with the ophthalmometer;

and tests made to see if these are changed by pressure or while the patient is making an effort to see close. The exact dimensions of the clear pupil should be noticed; and if large enough it should be carefully studied by skiascopy to ascertain the differences in refraction of different parts of the pupil, and any possible changes brought about in the effort to see close. The ability of the patient to interpret imperfect images might also be tested by trials by blurring with lenses of known strength at a known distance. The exact distance of the lenses before the eye should be given for each test made with lenses.

We want reports, not merely that altered adjustment had occurred in the aphakic eye, or suppositions as to how it might have been brought about; but actual observations of its mechanism.

E. J.

GRADUATE WORK OF THE AMERICAN ACADEMY.

A short, intensive postgraduate course in Eye, Ear, Nose and Throat is to be given in Philadelphia immediately following the regular program of the American Academy of Ophthalmology and Oto-Laryngology next October. It is an innovation for the society, and its effect will be watched with absorbing interest by all who are interested in stimulating an ambition for increased efficiency in the members of our specialty.

In the short time assigned for this course, the attempt is not made, or even considered, to cover the entire field. It is not even contemplated by the committee outlining the program to endeavor to cover any one subject completely. The desire is rather to review some most important subjects, omitting the A B C's, which members of the society are presumed to possess, but emphasizing certain essentials where many of us are apt to stumble, or which we might carelessly ignore.

In addition, newer ideas and thoughts in diagnosis, methods of examination and treatment, will be condensed and demonstrated, so that these thoughts

may be more readily absorbed by visualizing thru charts, lantern slides, and other means, other than by dry reading. The demonstrators for the course have been selected for their unusual fitness for that particular line of work, and some of them stand preeminent. The round table talks planned will also serve the purpose, it is hoped, of enabling members to become better acquainted, and permit a broad discussion and exchange of thought.

Depending on the success and impression made on the members of this first departure from the usual procedure of the society, the committee contemplates expanding the idea in the future with a view of offering many short selective courses which will be more or less complete, and will enable a member to devote his entire time, for example, to muscles, pathology, operative surgery and the like. A large registration is expected and it is hoped that those who expect to take advantage of this unusual opportunity will enroll early.

M. W.

INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

As elsewhere announced, the dates set for the International Congress of Ophthalmology at Washington, D. C., in 1922 have been changed to one week later, April 25-29. This has been done in order to make the best possible arrangements for the hotel accommodations of the large number of members who will be in attendance.

All papers intended for presentation at this meeting must be sent to the chairman of the Committee on Scientific Business, Dr. Edward Jackson, before January 1, 1922. This is necessary in order that the papers may be printed in a presession volume to be distributed to the members at the opening of the Congress, and to the authors of papers and those expected to open discussions upon them before that date.

MEETINGS FOR 1921.

The Societe Francaise d'Ophthalmologie meets in Paris, May 3, 4 and 5.

The Annual Congress of the Ophthalmological Society of the United Kingdom will convene in London, April 28, 29, and 30.

The Oxford Ophthalmological Congress will this year convene at Oxford, July 6, 7, and 8.

The Section on Ophthalmology of the American Medical Association will meet in Boston, Mass., Wednesday to Friday, June 8, 9, and 10.

The American Ophthalmological Society will meet at Swampscott, Mass., on the coast north of Boston, June 14 and 15.

The Pacific Coast Oto-Ophthalmic Society will meet at Seattle, Wash., July 14 and 15. It has been found impractical to hold its meeting on the boat while taking a trip to Alaska.

The Colorado Congress of Ophthalmology and Oto-Laryngology will be held in Denver late in July, probably on the 29th and 30th, altho the dates are not yet definitely fixed upon.

The American Academy of Ophthalmology and Oto-Laryngology will hold its annual meeting at Philadelphia, Pa., October 17, 18 and 19, to be followed on October 20, 21 and 22 by the intensive Postgraduate program arranged by a committee appointed at its last meeting.

CORRECTIONS.

In the editorial of our colleague M. Uribe-Troncoso upon the classification of Cataracts, page 141, the term intended "paranuclear" was erroneously "perinuclear" in the legend accompanying the diagram used. The error was the more serious because the point made was that the opacity appeared near the nucleus, not surrounding it.

In the "book notices," p. 224, the first sentence of the first paragraph should read: In the preface the author states that: "This book aims to be a collection of facts and not of theories."

BOOK NOTICES.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Col. Casey A. Wood, M.R.C., U.S.A., M.D., D.C.L. Assisted by a large staff of collaborators. Vol. XVII, pp. 12,801 to 13,544. Fully illustrated. Chicago, Cleveland Press. 1921.

This volume completes the article on Toxic Amblyopia, and carries the work to "Vertigo Paralysant," the so-called Gerlier's Disease already described in volume 7, p. 5369. As Wood's American Encyclopedia nears completion there are naturally more and more of these titles that refer one to preceding volumes; and others that are supplementary to articles that appeared in earlier volumes. One of the latter is the twenty-page article on "Trehpinning Sclero-corneal," by Col. R. H. Elliot, that gives the latest improvements in technic and recent data regarding this operation.

The section on toxic amblyopia, in volume XVI, began with a general review of the subject, of 17 pages, by Dr. W. H. Crisp. To this is added, mostly in the present volume, a further review (140 pages) of the literature of the subject, apparently by the editor, Dr. Wood. It is arranged alphabetically according to the name of the toxic agent. This makes the whole section of 159 pages the most complete, up to date and detailed account of toxic amblyopias that has appeared in the language. The 67 pages devoted to trachoma also consist of a general review by Dr. James Moores Ball, and many abstracts form the literature of recent years by the editor.

The section of over 80 pages on "Transmission of Radiant Energy by Various Ophthalmic Glasses and Ocular Media" is by Prof. Charles Sheard, editor of the American Journal of Physiological Optics. It deals with facts fundamental to physiologic optics, and observations likely to find important applications in the choosing and prescription of protective glasses; and the explanation of injuries which the various radiations produce. It is il-

lustrated by many diagrams, charts, tables and photographic reproductions of spectra.

Under the title "Tuberculin," the editor has given an account of the various forms of tuberculin that have been put upon the market, and the different tuberculin tests and tuberculin therapy. This is followed by a 23-page article on "Tuberculosis of the Eye" by Dr. W. C. Finnoff, which gives a general summary of present knowledge regarding this subject, the literature of which is now developing very rapidly.

The article on Tumors of the Eye, 315 pages, seems to have been written by D. F. Harbridge, 165 pages, and the Editor, 150 pages. It opens with a table of contents covering nearly 3 pages. It has many illustrations, among which we note one on page 13,280 purporting to show a case reported by Veasey, but which really illustrates a case of Coover's after it had become a basal-cell carcinoma. Another picture of the same case which had developed as a papilloma is shown on page 13,338. It is remarkable that in the immense amount of material here brought together, such mistakes have been so rare.

The place this volume has reached in the alphabet shows that another volume will complete the Encyclopedia. Its preparation, doubtless, is already so far advanced that nothing will now prevent or much delay the finish. In view of the enormous increase in the costs of bookmaking since the work was planned, the original subscribers are to be congratulated on a very good bargain, as well as the possession of the first real Encyclopedia of Ophthalmology to reach completion in any language. The manner in which the publisher has met his engagements is worthy of high commendation.

E. J.

La Cirugia del Globo Ocular y Su Tecnica. Dr. Rodolfo Guiral y Vondoni. In paper, 150 pages, 86 illustrations. Havana, Rambla. Bouza & Co.

This small book, on the surgery of the eyeball and its technic, makes no

attempt to cover the subject of ophthalmic operations. Not only is its scope strictly confined to operations upon the globe itself; in most cases but a single operation of each kind is described. It takes up what its author considers the best form of each operation, and describes its technic minutely and clearly.

It is the kind of book that a young man can read and study minutely with profit, in the effort to develop his own technic for operations upon the eyeball. For such, who read Spanish or who wish to learn to read Spanish, it will be particularly valuable. To the reviewer the selection of forms of operations to be described seems in the main to be conservative and wise.

Cataract operations occupy about half the book, beginning with a section on when should a cataract be subjected to operation. After cataract operations, iridectomy for glaucoma is described, and then the Elliot and Lagrange operations are considered. Next the complications of iridectomy and then iridotomy are taken up. Then, under operations on the sclera, Wecker's anterior sclerotomy is described, then posterior sclerotomy and Panas' combined keratectomy, the Saemisch operation, tattooing of the cornea by injections, enucleation of the eyeball, exenteration, pterygium, the treatment of wounds of the different parts of the eye, and removal of foreign bodies from the cornea.

The book is printed in good, but highly surfaced paper. The illustrations are half-tone reproductions of photographs, showing different steps in each operation. The chief criticism of them would be that showing so much of the patient's head and the hands of the operator, the eye appears on so small a scale that it is impossible to make out details that it would be profitable to study.

E. J.

CORRESPONDENCE.

The Medical Treatment of Cataract.
January 31, 1921.

To the Editor: In the September number of your JOURNAL Drs. Walter

S. Franklin and Frederick C. Cordes gave a very careful and interesting account of the results of their work and findings relative to "Radium for Cataracts." I read it, as also many others, with much interest. Their percentage of betterment, 84.3%, surely made its reading very interesting, and the fact of its being harmless adds much to its favor.

About twenty years ago Dr. Richard Kalish did much work with uncertain benefit to his patients, by the use of Prices' Glycerine preceded by cocaine, with massage used once a day, and gave many illustrations showing the exact conditions and results achieved. Many ophthalmologists all over the country gave it a trial, getting results better or worse, none published that I know of. Almost weekly, surely monthly, I have some patients come in my office and ask for medical treatment for the cure of cataracts. I can frankly say that my experience with Dr. Kalish's method was nil. The scarcity of radium makes its use impractical to the many. I would like to hear the reports and conclusions from some of the greater lights of our profession as to medical treatment.

JOHN S. KIRKENDALL.
Ithaca, N. Y.

An International Congress.

To the Editor: Owing to a misconception on the part of some as to the exact character of an *International Congress of Ophthalmology*, which is to be held in Washington, D. C., April 25-28, 1922, I am instructed by the General Committee to prepare the following notice and to request its early publication in the JOURNAL:

First, the proposed Congress is designated as an *International Congress of Ophthalmology*, which will be held under the auspices of *The American Ophthalmological Society, The Section on Ophthalmology of the American Medical Association and The American Academy of Ophthalmology and Oto-Laryngology*. It is an independent congress and is in no way affiliated with, or a continuation of, the regularly constituted International Congress of

Ophthalmology which has convened at regular intervals in the past, the last session of which was to take place in St. Petersburg in 1914 at the outbreak of the war.

Second, because of unavoidable complications in the arrangement of proper and comfortable accommodations for the delegates of the congress, it has become necessary to change the date of meeting from April 18-21, 1922, as previously announced, to April 25-28, inclusive, 1922.

LUTHER C. PETER,
Secretary.
1529 Spruce St., Philadelphia, Pa.

BIOGRAPHIC SKETCHES.

THOMAS H. SHASTID, M.D.
SUPERIOR, WIS.

HAWLEY; ALANSON WEBSTER. This well known ophthalmologist of Seattle, Wash., was born at Aurora, Ill., in 1865, a son of Sidney B. and Mary Ann Webster Hawley. He received his degree at Rush Medical College in 1891, and practiced general medicine in Chicago for ten years. In 1901 he studied the eye, ear, nose and throat at the

Royal London Ophthalmic Hospital, London, and the following year settled as ophthalmologist and oto-laryngologist at Seattle. He married September 5, 1901, at Kalamazoo, Mich., Miss Mary P. McGrail. He was attending physician to the Illinois Eastern Hospital from 1897-1901, oculist and aurist to the Chicago, Milwaukee and St. Paul Railway and to the Children's Orthopedic Hospital, Seattle, from 1918 until his decease.

Dr. Hawley was on his way home from the annual meeting of the American Academy of Ophthalmology and Oto-Laryngology at Kansas City, Mo., where he was stricken very suddenly. He died at Kalamazoo, Mich., October 25, 1920, aged 55.

The Doctor was a man of medium height, fair complexion, quiet and scholarly. He was a well known collector of rare books; and was one of the pioneer workers for medical inspection in the public schools, and in many other movements for the welfare of the community.

Dr. Hawley is survived by his widow and two daughters, also by a sister and two brothers, one of the latter being Dr. C. W. Hawley, of Chicago.

JUBILEE VOLUME OF PROFESSOR KOMOTO.

The abstracts given below are of papers published in the volume celebrating Professor Komoto's sixty-first birthday. Some of them were prepared by the authors of the papers and some by Professor Komoto. They have been translated from the German by Dr. H. Aufmwasser.

Parenchymatous Keratitis Due to Congenital Lues.

G. NAKAIZUMI has made histologic examinations in a number of cases and found: The affection is a proliferating inflammation. It consists of infiltration of the parenchyma with plasma cells and eosinophiles, with proliferation of the corneal cells and immigration of leucocytes. The fibrous lamellae are often irregularly placed, or destroyed and replaced by infiltrated

cells. The epithelial layers are often irregularly thickened, and contain in many places immigrated leucocytes. The epithelial cells themselves are often occupied by vacuoles. The basal membrane is also often destroyed. The cells are often destroyed. Bowman's author considers it of importance that among 18 cases he found ten times a fatty infiltration in the parenchyma, and the fats were cholesterol and glycerinestol. He also found a fatty infiltration in the epithelial layers.

Diagnostic Use of Fluorescein on the Cornea.

MYASHITA praises fluorescein coloring to discover and to render more distinct superficial lesions of the cornea, where oblique illumination and magnification are not sufficient for the finding of small phlyctenular and xerotic spots. The author has found that the normal human cornea is not colorable with fluorescein within sixty seconds, while with rabbits the coloring occurs after ten seconds. The human cornea is usually colored after three to four minutes, while this is possible with rabbits in thirty to forty seconds. The cornea, after coloring, needs for decolorizing a relatively long while, usually thirty minutes, and once in a while eighty minutes.

Ferments in the Aqueous Humor.

HAYANO has previously published an exhaustive treatise on the Amylase in the aqueous humor (Vol. I, Contributions of the Medical High School in Seoul). This contribution is the second of his studies on existing ferments in the aqueous humor. The results of his examinations are related as follows:

(1) Glycolyse and Invertase were not discernible in the aqueous humors of cattle, but maltase was positive in them.

(2) Lipase and Lecithinase were negative in rabbits and cattle.

(3) The author could not find pepsinase in the aqueous humor of cattle, by means of Gruetzner's or with Fuld's methods. While trypsinase could not be demonstrated in the aqueous humor of cattle and rabbits after Gruetzner's, Miller-Jochmann's or Fuld-Gross's methods, he positively demonstrated its presence with the procedure of dialysis. The demonstrations of the autolytic ferments were positive in the aqueous humor of rabbits after the same method. Polypeptoid splitting ferment was not found in the aqueous humor of cattle.

(4) Oxydase was also negative in the aqueous humor of cattle.

(5) Katalase was neither found in cattle or rabbits.

(6) Fibrin ferment was positive in the aqueous humor of cattle and rabbits. Fibrinogen could be demonstrated in the aqueous humor of rabbits, but not in the aqueous humor of cattle.

Incidentally the author made researches on the reducing substance in the aqueous humor, and came to the following conclusions: The total of the reducing substance, figured as to sugar, averaged 0.06 grams to the litre with cattle; in rabbits a little more was found; in the human being, on the other hand, a little less. In consistency it did not diminish thru hunger. While the reducing power of the aqueous humor gradually diminished, in case the aqueous humor was left in the eyeball after enucleation or the killing of the animal, it remained for a long time almost unchanged, if kept in a cold and dark place.

Furthermore, the author demonstrated that the aqueous humor from cattle and rabbits reacted as distinctly alkaline.

Sugar in the Anterior Chamber.

HOLI has made repeated experiments according to Bang's method on rabbits and came to the following results: In healthy men sugar in the anterior chamber, 0.08 to 0.091%, while blood sugar is 0.08 to 0.095%. In healthy rabbits, aqueous humor 0.116%, blood sugar 0.100%. Sugar in the anterior chamber diminishes after death. In diabetics the sugar in the anterior chamber changes with the amount of sugar in the blood. After subcutaneous injections of adrenalin the sugar in the anterior chamber increases with blood sugar; in the beginning rapidly, then gradually, reaches its maximum after three hours, and returns after eight to ten hours to normal. Sugar given by the mouth reaches the maximum after two to three hours, and after six to eight hours the normal. Sugar in the vitreous was found more rarely than in the anterior chamber. In rabbits, with hunger, no change in the amount of sugar was discernible.

Leproma on the Corneal Limbus.

ARISAWA has found in a case of leprosy an opaqueness of the cornea and at the outer lower limbus a leprous tubercle, with whose extirpation the cloudiness of the cornea cleared up strikingly. Histologically the author found in the tubercle a granuloma, which passed over from the muscular layers of the ciliary body to the sclera. The lepra bacilli in the ciliary body were more easily demonstrated than in the scleral tissue. They were located partly within the cells and partly without. The clearing up of the cornea resulted probably from the removal of the focus and consequent to the general treatment.

Mydriatics and Miotics in Affections of the Cornea.

MARUO had better results with miotics than with mydriatics, in different diseases of the cornea, especially with ulcerus serpens and marasmic ulcerations of the cornea.

Posttraumatic Parenchymatous Keratitis.

SHIMIZU's first patient, 21 years of age, injured his left eye. After seven days a parenchymatous keratitis developed. The second patient, a boy of 14, received a slight injury to his right eye with a fragment of stone at the center of the cornea; from which point a diffused opacity of the cornea gradually developed, as in the case of Komoto.

Linear Superficial Keratitis.

OSAKI, practicing in the southern portion of Formosa, encountered several times a peculiar affection of the cornea, of which the characteristics were: Active injection of the bulbar conjunctiva, photophobia and epiphora; on the surface of the cornea there appeared gray white raised lines, which crossed each other, so that different network pictures resulted. The outcome in slight cases is prompt healing in seven or eight days, but it usually is two months before the condition disappears absolutely. The opacity changes into dots, and the margins become diffused, and finally become in-

visible. Histologically the author found an edematous epithelial swelling. However, only one examination was made. The author has until now seen eleven cases, and among those only one case was found in a female. Cause unknown. Eye tension normal and cornea not insensible, as in herpes.

Superficial Marginal Keratitis with Pseudopterygium.

M. NOGOWA observed three cases of marginal superficial keratitis; all had pseudopterygium. The histologic condition is very similar to rodent ulcer and shows complete inflammatory changes. The epithelial layer, the superficial layer of the parenchyma of the cornea and of the conjunctiva are affected. Bowman's membrane is generally destroyed. The pseudopterygium shows a picture totally different from genuine pterygium: The epithelium is strongly exuberant; and between its cells, migratory cells in large numbers are found. Here and there ulcerated places are found. Below the epithelial layer is found a superficial layer of parenchyma, in which numerous round cells, polynuclear leucocytes, eosinophiles and plasma cells are distributed, and in which are to be found the new formed vessels. All the cases had chronic conjunctivitis and the secretion contained numerous pneumococci. These are cases observed on old Chinamen in Mukden, where the author practices.

Carcinoma on the Corneal Limbus.

FUSITA observed in a man aged 74, on the left internal limbus, a carcinoma, which was partly covered by the cornea. Histologically the following was found: One sees very distinctly how the carcinoma develops from the papillae of the limbus. The cells penetrate especially along the ciliary vessels towards the center; and invade there the ciliary body and the root of the iris. The particular portion which comes to the anterior chamber becomes partly necrotic; while at the root of the iris the cells grow rapidly and deeply inward until the epithelial layer is reached, and the iris itself seems to be in progress of inflammation. The

cells, which advance toward the ciliary body, seek tissues of least resistance, and so they were observed in the space between the ciliary body and the sclera, strongly advancing far into the suprachoroida and even in the ciliary body, thickly embedded between the muscle bundles. The pigmented epithelial layer is partly detached thru the carcinoma cells, which have penetrated to the surface.

The Nutrition of the Cornea.

N. KUMAGAI made an experimental study on the cornea of the rabbit. He found changes in the endothelium of the cornea after bringing air into the anterior chamber after emptying its watery contents. This he believes proof that the water of the anterior chamber shares in the nutrition of the cornea; furthermore, he found many oxydase granules in the endothelium.

With the thought that eserin accelerates the circulation of the aqueous humor, and by that raises the nutrition of the cornea, while atropin decreases it, the author examined the influence of both remedies on the epithelium and the endothelium of the cornea. In doing so he could not find any difference especially worth mentioning between the two. On the pathogenesis of opacities of the cornea, after cutting thru the posterior long ciliary arteries, he emphasizes the importance of the influence of damages from the margin.

Finally the author tested "the impermeability of corneal epithelium toward oxygen" (Bullot and Lor) but could not prove it.

Regeneration of the Cornea.

KUSAMA has made different examinations of cuts of the cornea; where the wound was shallow, or deep, towards perforation.

1. In the process of healing of the cornea the epithelial cells regenerate from the epithelial layers, and the parenchyma from the parenchymatous layer. But in perforating wounds the endothelial cells take part, because the posterior parenchymatous layer is developed from endothelial cells.

2. In the beginning of regeneration the capillaries come to the wound, but disappear again.

3. In the beginning the wound is glued together with a fibrin mass, and the margins of the wound are necrotic and swollen.

4. With the development of capillaries the multinuclear leucocytes come to the wound and form the inflammatory spears, which are to be looked upon as a form of degeneration of the leucocytes.

5. But real scar tissue of the wound develops from spindle cells, which are named by Salzer keratoblasts, and which are formed from permanent cells of the cornea; and which are seen plentifully at the wound, while the inflammatory spears derived from leucocytes disappear after a while.

Suppurative Scleritis and Its Histologic Findings.

MAZUMOTO: A man 48 years of age had left exophthalmos, which was caused by a fibromatous tumor of the orbit. Soon after his admittance into the hospital he developed on the same eye a severe chemosis; and later was noticed on the sclera above the cornea a scleritic focus, which soon developed pus. With this the cornea showed pus infiltration and was occupied by an ulcer. The eye was enucleated on account of panophthalmitis.

Histologically the affected area in the sclera showed suppurative necrosis with suppurative infiltration of the other tissues. Pus forming cocci were found, probably caused by gingivitis, which the patient had. The orbital tumor was a fibroma, which started from the periosteum. Soon afterwards the patient died from a purulent basal meningitis. The writer could find in the literature only a few cases (hardly 10), in which a purulent scleritis was examined histologically.

Power of Accommodation of the Japanese.

S. ISHIWARA has in 306 cases measured with his new instrument the near point at various ages. From the large number of cases a few are described:

At 10 years, =12D.; at 20 = 8.5D.; at 30 = 7D.; at 40 = 4.5D.; at 50 = 2 D. With the age of 50 the near point passes infinity. The far point with the age of 40 passes infinity. The connecting lines of the near points are not simply bent, as in the charts of Donders, but in the center (about at the age of 35) is slightly bent upwards.

Nature of Sympathetic Ophthalmitis.

T. NAKAMURA finds: 1. In normal rabbits the injection of serum into the carotids obtained from a guinea pig immunized with uvea of rabbits, produces no visible change in the eyes. Totally different is the result produced by such injection in rabbits in which bruising of the uvea has preceded the autoimmunization. There occur in these cases very marked ciliary injection and hyperemia of the iris, and under conditions also slight plastic iritis not only at the operated eye, but also at the nonoperated eye.

2. If one injects guinea pig serum immunized with the uvea of a rabbit directly into the anterior chamber of the rabbit, there occurs without exception a high grade of plastic uveitis, while in cases where instead of immunized serum normal guinea pig serum was used there was no apparent change.

3. Immunized serum obtained from guinea pigs after injection with the vitreous humor of rabbits, acts when injected into the anterior chamber of rabbit's eyes, in the same manner as the immunized uvea serum and leads to the occurrence of a marked plastic uveitis. The facts are of great importance in the experimental studies of sympathetic ophthalmitis.

4. By injecting into the anterior chamber of rabbit eyes, guinea pig serum which was immunized against crystalline lens of the rabbit, or vitreous humor of other animals, there occurs almost no reaction, as is the case with the normal guinea pig serum.

5. For these reasons the author has advanced a new theory. This theory, which the author describes as "Autoimmunization Theory," proved itself in the teaching of sympathetic ophthalmitis distinctly, as few other theo-

ries and hypotheses. Thereby possibilities arise to find more practical ways for the explanation of complicated conditions. Sympathetic ophthalmitis may be nothing but an inflammation of the eyes induced thru autoimmunization, resulting from cytotoxic uveal antibodies.

Exudative Degeneration of Retina with Multiple Miliary Aneurysms.

HATA, in the University Clinic in Tokio, observed this rare case of exudative degeneration of the retina with miliary aneurysms, as accurately described by Leber and Coats. It occurred in a youth of 18, who noticed for the last three years a diminution of his vision in the right eye. When the patient was first seen, his vision had decreased so that hardly fingers could be counted at 1 meter.

The fundus showed a very marked change. The retinal surface had a cobalt-bluish appearance and was occupied with numerous whitish gray, yellowish spots, of different forms and sizes, especially in the middle larger area. But in the periphery an evenly divided not transparent gray white mass was everywhere present. Therefore, the changes were more apparent toward the periphery and were strongly visible in the posterior portions.

It was interesting to note the changes in the vessels, since numerous capillary formations were found in different places, which showed different twists and miliary aneurysm. These were occasionally grouped like grapes, sometimes placed alongside of each other, like a string of pearls, generally at the branches of the upper and lower temporal veins. Besides these changes in the vessels there were found in different places large and small hemorrhages. Retinal detachment appeared later in the diseased eye, followed by glaucoma, so that it had to be enucleated.

Microscopic: Retina totally detached and, on account of the exuberance of the glia, irregularly thickened; the layers were not seen distinctly, visual cells totally destroyed. There was an abundant growth of immigrated phan-

tom cells, and precipitates of cholesterol crystals into the vacuoles of the parenchyma. A section from the strongly diseased peripheral portion showed plainly the new formation of capillaries and miliary aneurysms. One often finds the aneurysms grouped, so that the tissues have the appearance of cavernoma. The walls of the aneurysms are generally very thin, here and there, rupture or obliteration of the lumen of the vessel and perivascular round cell infiltration were found.

In the subretinal space coagulated exudate was found, in which numerously pigmented fatty-granular cells of different form and size appeared. Such phantom cells were placed with preference at the posterior surface of the detached retina, so that they were massed and blended together and also preferably invaded the substance of the retina.

Furthermore, there were found in the subretinal space several fibromatous new formations, similar to the bluish white foci, which are seen clinically above the papilla. They appeared almost homogeneous but showed coiled up fibers when Mallory stain was used; the nuclei within very weak and the vessels rather sparingly. They were on the one side intimately connected with the thickened retina, but fibrous connections between the two could not be demonstrated. On the other side they were intimately connected with the connective tissue of the choroid; while the fibers of the connective tissue of the choroid were accompanied by branches of the vessels which passed over directly into the new formations. Such formations were found in the region of the macula and in various other parts.

The author is of the opinion that the affection is not a pure retinal one, as the choroid also is involved with it. One should rather call it "chorioretinitis exudativa hemorrhagica chronica," characterized thru the appearance of miliary aneurysms. The bluish glimmering thru of the affected parts is due partly to the gliomatous degeneration of the retina and to the widely expanded intra- and subretinal

pathologic exudate; and its milky white spots were nothing else than sub- or intraretinal piling up of different masses of degeneration, especially from emigrated fatty granular cells (phantom cells from the pigmented epithelial layer).

Hereditary Atrophy of the Optic Nerve.

INOUE observed a family in which many suffered from the above affection; but of which only two sisters (aged 14 and aged 13) and a brother aged 15 could be examined. In all the central scotoma was found, and partly complicated with a peripheral defect. In the X-ray pictures the author found in all an unusual enlargement of the posterior clinoid process, bent forward, and the sella turcica a little more shallow than normally. Therefore, the author believes that the affection is probably caused by the abnormal development of the sella turcica. Resulting from it, the hypophysis in the development may produce the pressure anteriorly on the chiasm; whereby the papillo-macular bundles, as the weak resisting fiber bundles, become solely affected.

Primary Tuberculosis of the Papilla.

ISHIZU had a case under observation in a soldier, who afterwards died of miliary tuberculosis. On the papilla a tuberculous inflammatory tumor was present, the retina totally detached, choroid densely infiltrated, and in the subretinal space an inflammatory exudate with numerous tubercle bacilli were found.

Inflammation of Optic Nerve Due to Iodoform.

KAGOSHIMA observed, in a boy of 15 who was treated by a physician surgically with iodoform, a disturbance of vision, in which the fundus showed slight neuritis and the field of vision showed a central scotoma. In connection with this the case had a slight paralysis of the oculomotor. The urine showed a strong iodoform reaction. In the course of convalescence the central scotoma showed at times a break upwards, as we often observe in alcohol amblyopia.

Retrobulbar Neuritis Caused by Sea Weed.

T. AKATZUKA reports: A child of eight years had acute diminution of vision, after she had taken a very popular remedy (Maculi, a sea weed), against ascaris. Fingers could only be counted at one meter. The pupils were slightly enlarged, the reaction sluggish. Fundus normal, the veins only slightly enlarged. The vision became normal after a week.

Impaired Vision in Schools.

NIIMI wrote on the injury to the visual power in the public school in the city of Handa.

Physiologic Monocular Diplopia—Examination of Astigmatism.

CH. OGUCHI. When an emmetrope looks at the full moon, one observes the gradual appearance of a small elevation below or little to the side, and rarely above. This appearance shows itself equally in a room on a white paper disc (12 cm. broad), when you look at it from the distance of 5 meters; but naturally not as plainly, as seen in the full moon, also the variations of the elevation are not so clear. It can be seen more distinctly thru weak convex lenses, and convex cylindrical lenses horizontal, concave, cylindrical lenses vertical, and concave cylindrical lenses horizontal. On the square papers this elevation of the edge also slightly makes its appearance.

This appearance was definitely seen by Donders, Gut, Snellen Jun, Rochat, Gullstrand and Nakamura. The author is of the opinion that it was due to an involuntary partial accommodation. The degree can be judged about 0.5 to 1 D; when the eyes become tired, there appear even 3 to 4 crescents below and they oscillate constantly.

In regular astigmatism there appear in the principal meridian two elevations; there are of course, circles of dispersion. Thru its position one can also determine the direction of the principal meridian, so that the circular disc can be readily used for the examination of astigmatism.

Coccidiae in the Conjunctival Sac.

SAKAGUCHI found the coccidiae frequently in the conjunctival sac in the inhabitants among whom he lives (Province Yamayata) and describes several methods of staining.

Carbonic Acid Snow in Trachoma. Animal Experiments.

H. AKIYA treated 62 patients, mostly with remarkably good results. The carbonic acid snow was pressed upon the conjunctiva palpebrae and transitional fold for 20-30 seconds. Generally there was observed a severe inflammation, with a pseudomembrane, but without injury to the cornea. Applications were made once in 7 to 10 days, in all repeated several times.

Results: 1. The trachoma bodies were absorbed quickly or were markedly diminished. 2. Papillae disappeared or diminished. 3. Trachomatous pannus and ulcerations were generally healed, especially when particles of snow were applied for 10 seconds on the infected eyeballs and on the affected part of the cornea, which is not dangerous at all.

Acute trachoma was not cured as readily, it taking about two months. Pigmented spots with scars, which are not rare, were rendered invisible after CO₂ snow treatment.

Histologic examination was made several times, and with this the author could determine, that here occurred necrosis of the infiltrated cells which were in the granules and subconjunctival tissue. This was followed by inflammatory granulation in the bodies (granules), and in the other tissues, which soon were healed.

The author thinks that this therapy has a great future, that the affected tissue can be reached deeply and certainly thru the necrosis of the infiltrated cells thru freezing. It does not depend upon hyperemia and edema, as many authors, Montague and Harston believe. After application of the treatment on the cornea of rabbits there appeared depigmentation of the iris.

Intraocular Pseudotumor with Hemorrhagic Glaucoma.

T. IGARASHI reports: A boy of 15 came with the symptoms of hemor-

rhagic glaucoma of the right eye. After enucleation it was found, that a detachment of the retina and a hemorrhage were present; and also, which is very interesting, there were placed near the papilla a few round, or mushroom-like, rather large connective tissue tumors. They were placed close to the atrophic choroid and seemed to have originated from the same tissue or from the pigmented epithelial layer. Such new formations, large and small, were also visible at many places. The author does not say what it is. (From the description it appears that we had here a case of retinitis exudativa hemorrhagica, as with them we often encounter subretinal connective tissue tumors.)

To Measure the Color Sense with Colored Glasses.

S. ANDO described an apparatus for this purpose.

Disturbance of the Color Sense in Beri-beri Amblyopia and Retinitis Centralis.

Y. ITCH. In Japan both the above named affections are frequent. Central scotoma is the usual complaint. The author used, in order to recognize the disturbance of color sense, a color (preisel) on the basis of the work of George Young's Threshold test (British Journal of Ophth., July-August, 1918). Relative to it in central retinitis the yellow is mostly destroyed, while in beri-beri amblyopia, as can be expected, the green is first rendered invisible.

Resorption of Ultraviolet Light Thru Tissues of the Eye.

Y. SHIODZI has on thirteen different kinds of animals, on 50 eyes, made experiments relative to the resorption of ultraviolet light rays (with iron arc light and Adam-Hilger's Quartz Spectrograph).

Results: 1. Resorption of the cornea is different according to the animal, previously no difference has been accepted. 2. Also with the lens resorption, is very different. 3. The capsule of the lens shows no resorption, contrarily the nucleus of the lens had a

great aptitude for it. 4. Aqueous of the anterior chamber and the vitreous humor show with the thickness an increase in the resorption and in addition a secretory absorption. 5. The retina shows no absorption. 6. Resorption is most powerful with the lens, then followed the cornea, the vitreous and the aqueous humor. 7. The whole eye absorbs more than the lens alone.

Sarcoma of the Eyelids.

IMANISHI has observed, on the right upper lid of a patient 25 years of age, a sarcoma, which had its origin in the tarsus, or from the peritarsal tissues. Histologically it was a leucosarcoma; which was difficult to diagnose on account of it containing blood pigment, and to distinguish from pigmented sarcoma. Otherwise the tissue was made up principally of round and short oval cells.

The author has collected from the literature 50 cases, leucosarcoma 64%, and pigmented sarcoma 36%. Leucosarcoma generally originates from the tarsus or epitarsal tissue, while pigmented sarcoma usually arises from the pigment of the connective tissue. Leucosarcoma is mostly seen in young people and pigmented sarcoma mostly observed in older people. Relating to the sex, pigmented sarcoma occurs more in women and fewer times in men.

Imamikol in Syphilitic Affections of the Eye.

HAYASHI states imamikol is an anti-syphilitic preparation, produced in Japan, which contains 27.5% of mercury. The author has seen very good results with it. Each day on the average 0.0118 of mercury is used, while in salicylat of mercury the quantity of Hg. is 0.0078, providing, that each second day an injection of a 10% solution of imamikol is made.

Juvenile Form of Familial Amaurotic Idiocy.

OKAYAMA, in a girl fourteen years of age, who died in an absolute idiotic and blind condition, examined both enucleated eyes histologically. The older sister died in a similar condition in her 16th year.

The girl was, up to her 10th year normal, there occurred cramps after bathing; from then on gradually diminution of vision was noticed, and examined by Komoto (at that time V = 1/10). Papilla pale yellowish, otherwise normal, intellect somewhat weak; and for that reason the parents were told, that a similar condition as her sister had would follow. From then on the convulsions became more frequent, insomnia and irritability increased, and with them the imbecility. In her 15th year general paralysis was noticed, finally nutrition was difficult. Death thru exhaustion. Up to that time the patient had not presented herself so the eyes could not be examined; and only after her death we were told about it and the eye enucleation was freely permitted.

Histologically the author found: that visual cells disappear completely in the region of the macula and only gradually reappear toward the periphery; the same with the external granular layer and the external reticular layer. The inner granular layer is relatively well preserved. On the other side of the papilla, inward, both granular layers are distinguishable as distinct layers. The internal reticular layer healthy. The ganglia cells are also normal but the staining in the vicinity of the macula is not good and a few appear degenerated. Fibrous layer normal. The pigmented epithelial layer in the vicinity of the macula is remarkably depigmented and the pigment had more or less penetrated into the external layer of the retina without penetrating deeper. The papilla is not atrophic. Intracerebral; the cells of the pyramids are strongly edematous and degenerated, especially in the vicinity of the calcarine fissure.

The author believes that the Sachs-Tay disease is an affection of the layers of the ganglia cells; while the above affection is a retinal disease of the external layer, so that the affections are absolutely distinct.

Ring Scotoma with Monocular Diplopia in Hysteria.

CH. OGUCHI and G. SHIMA. In a hysterical young lady of 18 the double

ring scotoma was observed; the inner ring went thru the blind spot. The condition, however, often changed, in that the external ring, or both, disappeared occasionally when the patient felt well. The double ring scotoma is a remarkable symptom in hysteria, as Wölfflin said.

Furthermore, there was complaint of monocular diplopia on both sides. The false image was symmetrically on the temporal sides. In the examination with the stenopalic slit the position of the double pictures was not at first regular. But with the third examination there appeared a regularity, so that the false image in the horizontal position of the slit became always temporal and in the vertical position above; in further changes of position nasal or below. With the general improvement this sphere of the diplopia can be traced to, as the author believes, a partial spasm of the ciliary muscles which likely occurs nasalward and below.

Experiments on Sodium Glycocholat and its Clinical Uses.

K. YAMADA writes: When one puts one or two drops of the 5 per cent solution of sodium glycocholat on the conjunctiva, one notices irritation, hyperemia and edema, and on the cornea changes in the epithelium. Histologically in the parenchymatous tissue edema and enlargement of the vessels with infiltration of white blood corpuscles occur.

With subconjunctival injections, also, edema and hyperemia with infiltration of the cells especially near the vessels are found, with chemosis, hemorrhage, infiltration of white blood corpuscles demonstrable, in the parenchyma of the cornea, also infiltration of cell in iris, edema and enlargement of the vessels. This was likewise observed in the ciliary body, but in the choroid, retina and optic nerves no changes were seen.

By injecting into the anterior chamber one sees an extended inflammation: Iris strongly edematous, with cells infiltrated; anterior chamber filled with a fibrinous exudate and blood cells; likewise the parenchyma

of the cornea infiltrated with cells; the epithelial layer detached; likewise with the endothelial layer. Further back in the ciliary body, choroid and retina, large inflammatory changes and exudate in the vitreous body, and in the subretinal space. Lens cataractous. The inflammation can also be traced into the papilla and optic nerves.

By injection into the vitreous body the inflammation in the neighboring tissues is about the same, as described above. In the histologic examination of one eye, in which a 5 per cent solution was injected into the vitreous body, and the eye enucleated 20 days later, one does not see an inflammation; but a striking atrophy of the vitreous body and of the retina, with hypertrophy of the ciliary bodies and choroid, and the sclera. Consequently the posterior portion was more affected, as stated by Wessely. When fluorescein is injected in the upper vessels one observes more readily the well known Ehrlich's green line on the affected eye, compared with the other, healthy eye. The other has, in a few cases with staphyloma of the cornea, injected the above solution (3-5%) into the posterior part of the vitreous body; and has observed a shrinking, so that artificial eyes could be worn without an operation, as the author showed in photographs.

In this conjunction, it is remarkable that the author has demonstrated, that in subcutaneous injections in the frog the pigment of the pigmented epithelial layer becomes more luminous even if the frog is kept in the dark.

Urotropin in Ophthalmology.

T. SETO. The author has made relatively extended researches on the transition of urotropin into the chamber of the eye and the formaldehyd separated there. As reagent for urotropin he employed bromated water, and for formaldehyd, resorcin and potash solution. The albumin in the anterior chamber, and of the tears containing urotropin is precipitated with colloidal iron.

Urotropin, if injected into the veins of the ears of rabbits (2.0 gr. of a 50%

urotropin solution), reaches the anterior chamber immediately; and reaches its strongest concentration in the space of 30 minutes, and is secreted until four hours after the injection. But with tears it is secreted, even if it is a very weak solution, and this maximum concentration (1-4000) makes its appearance two hours after the injection.

Formaldehyd does not exist in all cases in the aqueous humor in a demonstrable concentration; for instance in artificial closing of the eyelids or hot compresses in the vicinity of the eyes, after instillation of atropin and eserin into the conjunctival sac, and after conjunctival instillation of diluted hydrochloric acid or administration of the same by mouth.

To demonstrate the bactericidal influence of the aqueous humor containing urotropin on virulent pneumococci, these two mixed media remain in the test tube 30 minutes to one hour, and are injected with negative result into the abdomen of mice.

The author could not make the above named experiment with hermitol and borovertin, because these two remedies, even in the freshly prepared solution give the formaldehyd reaction with resorcin-potash solution.

Histologic Examination in Experimental Commotio Retinae.

MASUDA has made experiments on rabbits' eyes, in order to determine the cloudiness of the retina, observed by Prof. Berlin; and to ascertain the pathologic changes of the retina after contusion. He made use of apparatus constructed by himself, which always readily produced the expected clouding of the retina, without complication with changes in the anterior segment of the globe. After the author had made many tests on rabbit eyes in order to ascertain the best conditions to produce clouding of the retina, he examined histologically 22 typical cases. The results of these examinations are stated by the author in the following:

1. Already after four to ten minutes the white coloring of the retina became apparent, but increased gradu-

ally, and reached after two to twelve hours the maximum; then after 24 hours began to diminish and disappeared within three to five days.

2. Without exception the author could demonstrate the serous saturation of the retina and its fine folds (a subretinal liquid collected), and with it a localized rather severe hyperemia of the choroid vessels at the point of the indirect cloudiness of the retina.

3. In a few cases, in which the cloudiness, as seen with the ophthalmoscope was very apparent, there were with these changes a tearing off of the rod layer, at times with participation of the external granular layer in the vicinity of the opalescence.

4. The narrow stratum of transudate between the choroid and the retina, described by Baeck and Lohmann, as consisting of a fine granular and fine threadlike mass, the author could verify only in isolated cases. Accordingly he does not agree that these changes in commotio retinae are essential.

5. Denig's humpy formations were either an artificial product following the treatment, or due to postmortem changes. The author also found similar structures in normal eyes as well as in cadaveric. In addition he found a formation, which had remarkable similarity with the Denig's hump, also in the posterior portion of the retina. From this fact the author believes, that Denig's hump formation is not directly due to the commotio retinae.

6. Based on his experimental studies the author is able to accept, that the causation of the white coloring of the retina in trial eyes is due to edema of the retina, and its fine small folds subretinal gathering of fluid. These two changes are not always equally present, one or both can be more or less prominent, or may be almost absent.

7. The edematous fluid is the result of transitory traumatic paralyzed choroid vessels. This is probably proven thru the presence of localized hyperemia of the choroid vessels, corresponding to the place of the white coloring. It is also possible that the

loosening or the tearing of the retinal elements thru the contusion can promote an inhibition of the transuded fluid.

8. In order to study the process of healing of the commotio retinae, the author examined histologically the trial eyes at different time periods. After the cloudiness of the retina had almost totally disappeared it brought him to the following results:

A. If the retinal clouding disappeared totally within three days and the retina showed normal conditions ophthalmoscopically, then there are in most cases no microscopic changes apparent.

B. But in a few cases, especially in such, in which the slight clouding of the retina remained visible to the ophthalmoscope for several days, there were found occasionally microscopically the fine folds without edema of the retina. Or the retina showed a number of small tears.

C. In a few cases, in which after the total disappearance of the cloudiness of the retina, dark discoloration and vigorous pigmentation of the ocular fundus appeared, there were found more or less vigorous overgrowth exuberance of the pigmented epithelial cells, without retinal changes, or an atrophy of the retina with atrophy of the external layer of the retina, and the gliomatous exuberance of the pigment in the retina was found. In a few cases, this overgrowth of the tissues leads to adhesions between the choroid and the retina.

D. Occasionally, after disappearance of the retinal cloudiness there appear yellowish-white striae, similar to the picture of retinitis striata, which microscopically are nothing else than the detachment of the retina caused thru the fine granular mass between the retina and the choroid.

E. The author demonstrated also that in contusion of the eyeball often lesions of the posterior layers of the retina and small subretinal hemorrhages are present. He thinks that the visual disturbances in commotio retinae are due to these changes.

10. In reference to the nature of the clouding of the retina in the human eye it is the author's opinion, that we can accept with the greatest probability, that the serous saturation of the retina and the low grade subretinal transudate is the essential etiology; and that those liquid components are mostly furnished thru diffusion, without accepting the possibility of a transudate from the retinal vessels.

Glaucoma and an Operative Method.

KIRIBUCHI believes that glaucoma is due to a disturbance of compensation of the intraocular stream changes; which occurs more or less acutely in the

inflammatory form, while it occurs gradually in glaucoma simplex. Its treatment consists in the following: A flap of conjunctiva above the cornea and turning this downwards. After that he makes a broad incision with a lance in the sclera; and a large iridectomy, whereby the iris is pressed in on both edges of the wound and the conjunctival flap is replaced and sewed with a loop suture. Afterwards the eye is often pressed upon, so that the wound is burst open repeatedly, and in this manner a subconjunctival fistula is established. The author assures us, that he had during the past five years very good results in many cases.

ABSTRACTS

Danis, Marcel. The Early Degeneration in the Anterior Optic Pathways. *Annales D'Oculistique*, August, 1920.

The structure of the optic nerve and tracts is revealed in a remarkable manner by the coloration methods of Weigert and Marchi. Ehrlich's and Golgi's methods also furnish important observation for anatomic study. Weigert's and Marchi's methods color the myelin sheath without modifying the axis-cylinder. Weigert's method is not applicable until a long time after the lesion. The method of Marchi does not give absolute results, as it does not color at the same time all of the myelin sheath and the coloration is influenced by the coarseness of the sheath. Golgi's method is not applicable to new-born animals, as they do not yet possess a myelin sheath. Ehrlich's blue method cannot be applied to the study of degenerative changes.

Danis verified the methods of Cajal, showing the course of the optic fibres by their degeneration and staining after enucleation and exenteration of the eye, by experimental studies upon cats. The extensive article takes up: the history, the anatomy of the nerve, chiasm and the tracts, the technic of the degeneration experiments, the normal nerve, the lesions produced one to twenty days after the injury, the mode

of degeneration, its origin and rapidity, the role of the myelin, the influences of the traumatism, the identification and course of the various fibres.

The reduced silver method of Cajal applied to the study of early degenerative changes in the anterior optic pathways of the cat, permits of the following conclusions:

In contrast to the methods of Weigert and Marchi, as prophesied by Dustin, the study of the early axillary changes by the Cajal method gives us valuable information.

There are four kinds of fibres—fine, coarse, those with irregular contours and those intermediate between these varieties. The coarse degenerate more rapidly than the fine. The degeneration proceeds in a different manner in each kind of fibres. Some degenerate early and some slowly. The process goes on in spots, not in the total length at the same time. About the twentieth day the optic fibres are completely destroyed thruout the course of the nerve. Those at the lamina cribrosa resist the process more than the coarser fibres of the optic nerve, and undergo the identical degeneration observed in the fine ones. Centrifugal fibres were observed. There were no bifurcated fibres in the chiasm of the cat. There are no interretinal fibres.

Direct and crossed fibres were seen in the chiasm and in the fillet. A bundle of direct fibres in the external edge of the chiasm and the beginning of the fillet, were originally observed. Direct fibres proceed to the medio-internal part of the optic nerve. Crossed fibres form a curve at the origin of the connecting homonymous fillet. Crossed and direct fibres form a curve at the central extremity of the optic nerve. The body of the chiasm is composed of crossed fibres, except at the beginning. Both crossed and direct fibres are intimately mixed in the fillet.

His observations were different from those of Gehuchten and Molhaut as follows:

They found that the method of Marchi showed that the degeneration of the nerve fibre began at the same moment in all the length of the nerve, which is contrary to that found by the method of Cajal, where we see that the degeneration occurs in contiguous spots along the fibre. The myelin and the axis-cylinder do not degenerate in the same manner or with the same rapidity.

The following points yet remain obscure: To what is due the difference between the modes of degeneration of the coarse and the fine fibres? Why do certain fibres degenerate early and others late? He confirms the description of Cajal as to degenerative changes in the cat; and, with the aid of other methods, those which agree with Gallemaert's observations in man. They differ from those of Henschel, Bernheimer and Cramer in man, and with those of Bossalino in the cat, the rabbit and in man.

It would have been most interesting to have procured the anatomic specimens from human individuals deceased several days after an enucleation or exenteration, but the specimens were not available. It would likewise be interesting to obtain studies of recent lesions of the nerve and optic tracts, in certain maladies. His researches in coloring the cylinder axis, itself, answer the question of Koelliker, who asked to be shown the fibres passing directly through the nerve in the homonymous fillet.

H. V. W.

Calvin C. Rush. Treatment of Myopia. China Medical Journal, v. 34, 1920, p. 606.

Rush lists myopia as one of the four chief causes of two millions of cases of blindness in China. He puts trachoma first in the list, gonorrhea second, syphilis third and myopia fourth. As a result of his expérience of a year in China where he had the opportunity to examine the eyes of many students, he found 58.4% myopic, a percentage, he says, approximately four and one-half times greater than would be found in an American college.

He thinks the myopia is due largely to the poor lighting in Chinese houses, schools and shops. As for treatment, he emphasizes the measures of prevention as of first importance. He advises atropin cycloplegia for examination of myopic patients every year, decreased near work for cases of high myopia, and great care in the adjustment and wearing of spectacles.

H. J. H.

Jess, A. Permanent Injuries of the Whole Retina from Glare of Sun. Klin. M. f. Augenh., v. 64, February-March, 1920, p. 203.

A man with normal vision noted immediately after observing the eclipse of April 17, 1912, for 15 minutes with unprotected eyes, that his sight was very much impaired. Two days later V. R. = 5/10; V. L. = 5/15 with central scotoma of 10 degrees for green of left eye, which showed two dark red spots at the macula with yellow centers. On May 13th the scotoma had disappeared and in the right eye was no marked scotoma. In the course of years, vision of both eyes deteriorated. At a reexamination on November 12, 1918, there were no ophthalmoscopic changes with the usual illumination, but with red-free light both maculae showed a minimal defect with sharp serrated borders. V. R. = 5/35; V. L. = 5/20. Visual fields contracted. The perception of blue-yellow was more damaged than that of red-green. This marked hemeralopia and the early exhaustion of vision justified the conclusion that the seat of the lesion was in the neuroepithelium, in the cones and rods of the whole retina, and not in the

conducting apparatus. He believes that some functional disturbances, so far considered as neurasthenic or hysterical symptoms, may find their explanation in a disease of the rods and cones. He thinks that if recent and old cases of glaring shall be examined with regard to the peripheral borders of color perception, proofs will be gathered, that the peripheral lesions of the retina accompanying the central focus of coagulation will be a constant finding.

C. Z.

Lampert, P. Anomaly of the Inferior Canaliculi. Ann. d'Ocul., 1920, v. 157, p. 168.

In the right eye, between the punctum and the caruncle, the canaliculus was open in the form of a groove, starting about 1 mm. from the punctum, and terminating at the nasal angle of the eye. Its borders were slightly everted. In the left eye, the groove commenced 2 mm. from the punctum, and otherwise resembled the other. The probe could be passed thru the normal puncta, the grooves, and the remaining normal canaliculi into the normal sacs. Previous operative procedure was denied.

C. L.

Ohsaki, O. Influence of Corneal Elasticity upon Apparent Intraocular Tension. Nippon, Gank. Zasshi, July, 1919.

The author studied the intraocular tension of a 41 year old patient, who had recovered from an infection of rodent ulcer on both eyes, and had been left with a thinned cornea. He found that the intraocular tension went down the more the weight was increased. Especially was this plain on the side which had the more recently recovered. So, the heavier the weight, the more certainly he obtained a value which was far lower than the normal intraocular tension. The author, therefore, believes that the physical condition of the membrane must not be forgotten in measuring the intraocular tension.

KOMOTO.

Oswald, A. Bilateral Closure of Central Retinal Artery after Intoxication by War Gas. Klin. M. f. Augenh., v. 64, February-March, 1920, p. 381.

Oswald reports disease of the vascu-

lar system in a man, aged 34, after inhalation of gas in a bottle; which led to gradual closure of the afferent blood vessels of the retina, with subsequent degeneration of the inner retinal layers and complete amaurosis of the left, and almost complete amaurosis of the right eye. According to the anatomic investigations of Anhoff, inhalation of war gas causes easy coagulability of the blood, increased viscosity and subsequent retardation of the blood current as etiologic elements for thrombosis. The damage to the endothelia by intense immigration of leucocytes into the vascular walls is considered as an instant effect of the poison. The possibility of thrombotic closure of the capillaries and precapillary arteries was ascertained by these investigations. A pathologic factor may be intense contraction of the blood vessels thru irritation of the motor center in the medulla oblongata. The character of the ocular arteries as terminal arteries explains why they are chiefly affected, because an interruption of circulation immediately produces functional disturbances, not noticeable in other organs.

C. Z.

Gjessing, H. G. A. Coronary Cataract (Vogt) and Other Lens Changes. Klin. M. f. Augenh., August-September, 1920.

Examinations of the anterior portion of the eye by intensive illumination and strong magnification reveal many unsuspected changes and lesions. The author has examined 4,768 eyes in 2,411 persons, aged from 3 months to 87 years, by the Gullstrand lamp and Czapski-Zeiss corneal microscope with full mydriasis.

It has been shown by Erggelet, Koeppe, v. Hess, Vogt, Krenger, Schurmann, Lussi, Siegrist, Wehrli and others that structural peculiarities in the anterior portion of the bulb are different in the Swiss people and the Norwegians. For instance: In the cases examined by the author there were only 15% of the so-called shagreen bodies shown in the lens in the older people. Vogt stated that these are never found earlier than the twenty-eighth year.

This shagreen formation consists of roughly grained calcified papillae with tooth-like projections of a somewhat greenish color, something like the leather of shark skin, on the external layers of the lens. It is only to be seen by oblique illumination under a high magnification. In general, the appearances found were such as were described by Vogt and his school. When there is no cataract the external layers of the lens nucleus appear to be entirely smooth.

The author does not agree with Vogt that the yellowish discoloration of the lens coming on with age is connected with any maximal hardening of the nucleus. He also does not connect this coloring with any pathologic process in the lens.

The shagreen formation in the lens is composed of epithelium and first formed on the superficial lens fibres. Koepp's type of preglaucoma is more often observed.

Congenital, pointlike opacities without typical localization were found in about 5% of the cases, but have nothing to do with cataract formation. Cataractic changes were found in 716 of the 2,411 persons examined (29.1%), and in 644 of these (90%), there was typical coronary cataract. He found this form of cataract in three children of 6 to 10 years of age, in seven menstruating girls of 12 to 13½ years, as well as in one not yet adolescent boy. In several of these the changes were in both eyes. The greater percentage of coronal cataracts were in elderly people, in which the breaking of the continuity of the lens fibres could be seen with the beginning of the cataract, or shortly before. The cause lies usually in a lessened fluid content of the fibres.

The precataractic symptom begins about the forty-sixth year, as a radial clear cleft, as a rule lying directly under the capsule, a strongly refracting fissure, which, as age develops, in some cases, becomes opaque. The "water" fissure proceeds generally to the usual form of senile cataract. It is more often found at 45 to 50 years of life and is combined with the coro-

nary type, with which it has something genetically to do.

The examinations reveal nothing in regard to the chemical effect of light or concomitant diseases; but, contrariwise, puberty, climacteric, also the influence of gravidity in women, played a decided role in its development.

In 168 out of 387 women who were nursing children, 48.1% of lens opacities occurred; whereas in 128 out of 771 other women there were only 15.8%. The general condition likewise played a role.

The refraction and the color of the iris have nothing to do with vision. The antagonism between senile, macular changes and cataract is established. A diffuse uveitis causes hyalin degeneration and depigmentation of the iris. Indican in the urine has no relation to the pathogenesis of cataract. The tension was examined in 328 individuals over 50 years of age, by the Schiotz tonometer, and in 130 with opacities the average was 20 mm. Hg., and those without 21 mm. Hg., the average being 20.5%.

The result of the examination of the etiology of cataract by this focal illumination and high magnification, was like that of Le-Grand Nicol, who stated in 1574: "Non ergo credo omnium suffusionum est eadem causa."

The essay of 31 pages is accompanied by a number of diagrams showing the visual acuity of blue and brown eyed men and women, and of those with and without clear lenses. (See A. J. O., v. 3, p. 709.)

H. V. W.

Goldflam, S. Blindness from Methyl Alcohol. *Klin. M. f. Augenh.*, v. 64, May, 1920, p. 684.

The prohibition introduced into Russia at the beginning of the war, led to the consumption of substitutes and adulterations for the popular brandy, mostly by methyl alcohol; and caused many deaths and sudden blindness. Goldflam observed 11 cases. Those who consumed from 200 to 260 ccm., generally died; while the majority, after taking from 40 to 80 ccm., presented visual disturbances. These were bilateral and occurred rapidly, with

immovable pupils and normal eye-ground; followed after several weeks by blindness, central scotoma, transient improvement of sight, and then again impairment or loss of vision from atrophy of both optic nerves.

Compared with other intoxications, that by methyl alcohol resembles most amaurosis from *filix mas*, which, however, does not cause a central scotoma. The prognosis is very bad. If vision is once impaired, there will be no return to normal, on account of consecutive descending atrophy of the optic nerve. The often present scotoma indicates the early involvement of the ganglion layer of the retina. The primary affection invades the whole intraocular portion of the optic nerve.

Those patients, who freely vomited spontaneously or by irrigation of the stomach, fared best with vision, even if several hours had elapsed after consumption. Methyl alcohol could be detected in the organs of cadavers as late as from 48 to 72 hours after ingestion. In later stages diaphoresis thru aspirin moist heat packs and electric baths seemed useful, but a radical influence on the pathologic process in the optic nerve cannot be expected.

C. Z.

Schwarzoff, G. Orbital Phlegmon. Klin. M. f. Augenh., v. 64, March-April, 1920, p. 240.

A farmer, aged 17, was injured by a beard of a grain which stuck in his right eye and was removed by a physician. A week later the eye became red, then painful and swollen with fever and delirium. When he was brought to the clinic, two weeks after the injury, there was exophthalmos of about 8 mm. No wound was visible, but upon eversion of the upper lid and slight pressure, pus oozed from the upper fornix. Vision was reduced to perception of movements of the hand. The fundus showed engorged veins and very narrow arteries.

On account of the serious general condition, an incision along the eyebrow was made and the periosteum detached from the upper orbital wall, without reaching a subperiosteal abscess. Only small drops of pus came

from the inflamed orbital tissue. At the dressing the next day, with further detachment of the periosteum, copious pus was evacuated. As the sensorium was very much disturbed a day later, the orbit was exenterated, with no relief. The patient died after three days.

The pus contained only staphylococci, and the autopsy revealed purulent thrombosis of the cavernous sinus, caused by thrombophlebitis of the orbital veins; and circumscribed basal meningitis of the chiasm. The pathogenesis and therapy are discussed in detail. If the location of the incision is not determined by a demonstrable abscess the method of Birch-Hirschfeld to enter at the upper orbital wall for inflammation of the retrobulbar tissue is recommended. It has the advantages of reaching a subperiosteal abscess without opening the orbital septum, and the walls of the accessory sinuses of the nose which are frequently the cause, and of better drainage.

C. Z.

Franz, G. Lowered Tension of Eye-ball in Intraocular Tumor. Klin. M. f. Augenh., v. 64, February-March, 1920, p. 348.

Franz reports the clinical histories, and histologic findings of three cases of intraocular tumor with detachment of the retina, and decrease of intraocular tension. The anatomic examination verified the clinical diagnosis, but did not explain the occurrence of the rare hypotony in intraocular tumor. In all cases, the ciliary body was affected as the seat of the tumor, and the bloodvessels of the whole uveal tract were intensely filled. There were no inflammatory-atrophic changes, that might have led to diminished secretion of the aqueous and thus to decreased intraocular tension. All showed detachment of retina, shrinking of vitreous, but preservation of the sinus of the anterior chamber and patency of the canal of Schlemm. Whether the hypotony was caused by increased efflux of aqueous could not be determined.

Thus there are cases which do not lead to glaucomatous conditions, but to hypotony; which cannot be explained

by inflammatory complications. It is of great importance to recognize such cases in spite of the disturbing presence of detachment of the retina and to operate upon them as early as possible. (See also A. J. O., v. 3, p. 872.)

C. Z.

Chevallerean, A., and Offret. Xeroderma Pigmentosum and Ocular Lesions. Ann. d'Ocul., 1920, vol. 157, p. 236.

These authors report a case when the eye was involved in a lesion of the right side of the face. There was a tumor at the internal part of the sclero-corneal limbus which encroached $\frac{1}{2}$ mm. upon the cornea and extended about 6 mm. towards the inner canthus. Diagnosis papillary epithelioma. The tumor was dissected easily, except at the limbus and the cornea, where some lamellae were removed with it. The pathologic examination of the tumor is given. Subsequently radio-therapeutic treatment was given and the patient is still under treatment. The other eye had been removed by another doctor for a tumor of the cornea and conjunctiva, which had recurred after the first removal.

C. L.

Wiegemann, E. Technic of Trephining in Glaucoma. Klin. M. f. Augenh., v. 64, January, 1920, 117.

For obtaining a better and safer covering of the trephine opening which will not be exposed to external influences as under the thin conjunctiva, Wiegemann devised the following modification: A thin von Graefe's knife is inserted into the limbus and after counterpuncture, 4 mm. distant, the superficial lamellae of the cornea, and a small flap of sclera and conjunctiva, 4 mm. wide, are dissected up. After lifting the flap the corneo-scleral junction is trephined and the flap placed over it. In consequence of the better covering the cushion gradually becomes flat.

C. Z.

Hess, C. v. Limits of Visibility of the Spectrum to Animals. Naturwiss. 1920, v. 8, p. 197-200.

Hess found in the lowest metazoa a

lack of perception of the lowest amount of light perceptible to the human eye. The sea urchin acted towards colored rays exactly as a totally color-blind man, or one adapted for dark seeing. He found that the ultraviolet rays exerted a marked influence on the movement of the caterpillar. He found in the Arthropods, that the eyes present a very high stage of development. In one form, the refracting apparatus served the purposes of (1) the collection of the visible rays, (2) the changing of the invisible short waved rays into visible long waved ones by means of fluorescence, (3) a considerable widening of the visual field by means of the fluorescence thru tangential rays, (4) by absorption of the rays of short wave length protection of the nervous substance from their deleterious effects. The vertebrates living in water possess similar borders of the spectrum to those of the invertebrates with non-faceted eyes, those who live in the air acquire a considerable extension of the border towards the rays of long wave length. In some vertebrates, there is even a shortening of the spectrum towards the violet end.

C. L.

Behmann, A. Annular Opacity of Vossius. Klin. M. f. Augenh., v. 64, March-April, 1920, p. 255.

Behmann described three new cases. The opacity is produced by an impression of the pupillary margin upon the anterior surface of the lens, caused by contusion, which indents the cornea and brings it and the iris in contact with the lens. By exudation of a sero-fibrous mass the pigment of the iris sticks to the surface of the lens. Behmann observed with the Nernst lamp and corneal microscope that the opacity consists of pigment particles, which he also saw floating in the aqueous and in deposits on Descemet's membrane, being identical with the single corpuscles of the ring. They could be noticed even after ten days, while remnants of blood after absorption of the hyphema are not further visible. The opacity lasts about 14 days. If longer, lesions of the lens must be assumed, which do not belong to the typical picture of Vossius' ring.

C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities

DEATHS

Dr. Joseph W. Bettingen, St. Paul, a member of the Minnesota Academy of Ophthalmology and Oto-Laryngology, died January 14th, aged fifty-five.

Dr. Alfred St. Clair Buxton, consulting surgeon to the Western Ophthalmic Hospital, died December 19th, aged sixty-seven.

Dr. A. Fortunati, professor of ophthalmology in the University of Rome, author of numerous works on trachoma, detachment of the retina, etc., died at the age of sixty-seven.

Dr. Charles Huggins, consulting ophthalmic surgeon to Guy's Hospital, and ophthalmic surgeon to the French Hospital, London, died suddenly on December 28th, at the age of seventy-five.

Dr. Malcolm MacLean, of Chicago, died February 11th from pneumonia, aged forty-one.

Dr. Arthur Mathewson, Washington, D. C., founder of the Brooklyn Eye and Ear Hospital, died December 31st from arteriosclerosis, aged eighty-four.

Dr. George T. Stevens, New York, most widely known for his work on the ocular movements, and especially the heterophorias, died January 30, aged eighty-eight years.

Dr. Hermann Ulbrich, of Vienna, died in Turkestan, April 1st, 1920. His work on bacteriology and postoperative infections of the eye is well known.

SOCIETIES

The annual dinner of Past and Present Students of the Royal London Ophthalmic Hospital was held on February 10, 1921, at the Cafe Royal, Regent street.

At the February meeting of the Chicago Ophthalmological Society, papers were read by Dr. Harry Woodruff on "Bilateral Abducens Paralysis"; and by Dr. Robert Von Der Heydt on "Coronal Cataract," a common form of progressive cataract in adults.

At a joint meeting of the Chicago Neurological Society with the Chicago Ophthalmological Society, December 16th, 1920, papers were read by Dr. V. S. Counsellor and George W. Hall on "Dural Sarcoma Producing Visual Disturbances"; by Dr. George B. Hassin on "Polioencephalitis Superior and Inferior"; Dr. E. V. L. Brown, on "The Pupil in Health" and Dr. George F. Suker on, "The Pupil in Disease."

At the January meeting of the New York Academy of Medicine, Section of Ophthalmology, papers were read by Dr. J. M. Wheeler, on "Different Types of Plastic Operations"; Dr. Martin Cohen, "Lipemia Retinalis with Hypotony in Diabetic Coma"; Dr. H. H. Tyson on "Metastatic Choroiditis following Pneumonia"; and by Dr. W. R. Broughton on "Tumor of the Iris." At the February meeting papers were read by Dr. G. E. de Schweinitz on "Concerning Ocular Conditions in Pituitary Body Disease in Syphilitic Subjects"; the discussion was opened by Drs. C. H. Frazier and Charles L. Dana.

The annual general meeting of the Ophthalmological Society of New South Wales was held at the Sydney Hospital on August 4, 1920, Dr. F. Guy Antill Pockley, the Vice-President, in the chair.

After the annual report and the financial statement had been presented, it was announced that the following officebearers and members of Council had been elected for the ensuing year: President, Dr. Gordon MacLeod; vice-president, Dr. Guy Antill Pockley; honorary treasurer, Dr. J. C. Halliday; honorary secretary, Dr. J. J. Kelly; members of council, Dr. R. H. Jones and Dr. E. A. D'Ombrain.

The February meeting of the Kansas City Eye, Ear, Nose and Throat Club was held February 17th. Papers were presented by Dr. L. R. Forgrave, St. Joseph, on "Pituitary Tumor"; Dr. W. C. Proud, St. Joseph, on "Magnet Removal of Steel from the Eye"; Dr. O. P. Bourbon, on "Trichiasis and Entropion."

PERSONALS

Dr. Kaspar Pischel, of San Francisco, has returned after a three months' European trip.

Dr. A. Gerard East has been appointed ophthalmic surgeon to the Royal Cornwall Infirmary.

Dr. C. D. Conkey, of Duluth, Minn., is spending the winter in Los Angeles, Cal.

Dr. W. C. MacFetridge has been appointed assistant surgeon to the Royal Victoria Eye Hospital, Dublin.

Dr. Hans Barkan, San Francisco, suffered a Pott's fracture while skeeing at the Winter Carnival in Truckee during the Christmas holidays.

Dr. Harrington B. Graham has been elected chairman to the Eye, Ear, Nose and Throat section of the San Francisco County Medical Society for the year 1921.

Professor Hertel of Strassburg has been appointed successor to Professor Sattler in Leipzig, and Professor Fleischer of Tubingen has succeeded Hofrat Oeller in Erlangen.

Dr. John E. Weeks and Mrs. Weeks, of New York City, sailed from Vancouver, B. C., the first week in February for a four months' trip in which they hope to visit Japan, China and the Philippines.

Mr. J. Herbert Parsons has been elected president of the Illuminating Engineering Society in succession to Mr. A. P. Trotter. Mr. Parsons who was the first chairman of the Council of the Society, has taken a leading part in the sections in its work dealing with the influence of light upon vision, and is a member of various committees on the subject.

Dr. Casey A. Wood is now located at the Tropical Research Station of the New York Zoological Society at Kartabo, British Guiana, where he finds with congenial surroundings, much of interest to observe with regard to the animals and especially the birds and lizards of that region. He plans after visiting Dutch Guiana to go to Rio Janeiro where he and Mrs. Wood intend to sail for England where they will spend the summer.

MISCELLANEOUS

A donation of \$50,000 has been given to the building and equipment fund of the Eye, Ear, Nose and Throat Hospital, New Orleans, by Mrs. John Dibert.

It is announced that the Lucien Howe Prize for the best essay on some branch of surgery, preferably ophthalmology, will be awarded by the Medical Society of the State of New York at the next annual meeting, May 3, 1921. Essays should be in the hands of the chairman, Dr. Albert Vander Veer, 28 Eagle street, Albany, New York, not later than April first.

Dr. L. Webster Fox of Philadelphia was re-elected president of the Pennsylvania Home Teaching Society for the Blind. In his annual address Dr. Fox said the total number of volumes now issued is 3,948, of which 1,131 are written in Moon type. Last year there were 735 active borrowers. The publication fund of \$100,000 now amounts to \$7,586. Two recent inventions for the use of the blind were noted—the optophone and the typophonia, which it is claimed can be used readily by those who have become blind in adult life.

A graduate course in ophthalmology will be given at the ophthalmologic clinic of the Hotel Dieu under the auspices of the Paris Medical Faculty, beginning May 10 and continuing through the month of June. Prof. F. de Lapersonne and Drs. Terrien, Guillemont, Hautant, Velter, Prelai and Monburn will conduct the courses; which will include clinical examinations and practical surgical and laboratory work. A special certificate from the Paris Medical Faculty will be given on completion of the full course. The number of students will be limited to forty and the fees will total 150 francs. Physicians and students desiring to take the course should apply to the secretary of the Faculté de médecine de Paris.

The supplement to the Union Alumni Monthly for February is an historical sketch, "Union's Part in Medical Benevolence," by Dr. C. M. Culver of Albany. The biographic notices it contains are limited to deceased alumni of Union College. But it mentions that 13 of the living medical graduates of the institution, 10 per cent of the whole number, are included in "Who's Who in America." The only ophthalmologist mentioned is Thomas Featherstonhaugh, for several years Medical Referee of the Pensions Bureau. Had living doctors been included the names of the translator of Landolt's "Accommodation and Refraction," and of Alexander Duane should have been prominent in the list.

The Atlantic Monthly for January contains an article on "Germany Revisited," by J. Bennett Nolan, Esq., of Reading, Pa., in which he speaks of the renowned "Augenklinik" of Wiesbaden and its famous head. The former "seemed to be as scrupulously clean and well ordered as ever"; but of the doctor he writes: "He stood before me thin and pallid; his clothes were shiny and worn. Although he greeted me cordially enough it was evident that the iron had entered his soul." He spoke of the war and the shame and bitterness it entailed. He said his English patients were returning but he could not take them at the old rates nor have one rate for the Germans and another for the English and Americans. "One of your American houses has asked me to come over for three months, they to arrange my consultations and take ten per cent of the fees. But I will not go while I must hang my head. When we Germans are reinstated in your public opinion then, perhaps—" He spoke of vexatious restrictions imposed by the authorities in occupation, not knowing perhaps that they were copied from German proclamations found in Lille and Belgian cities.

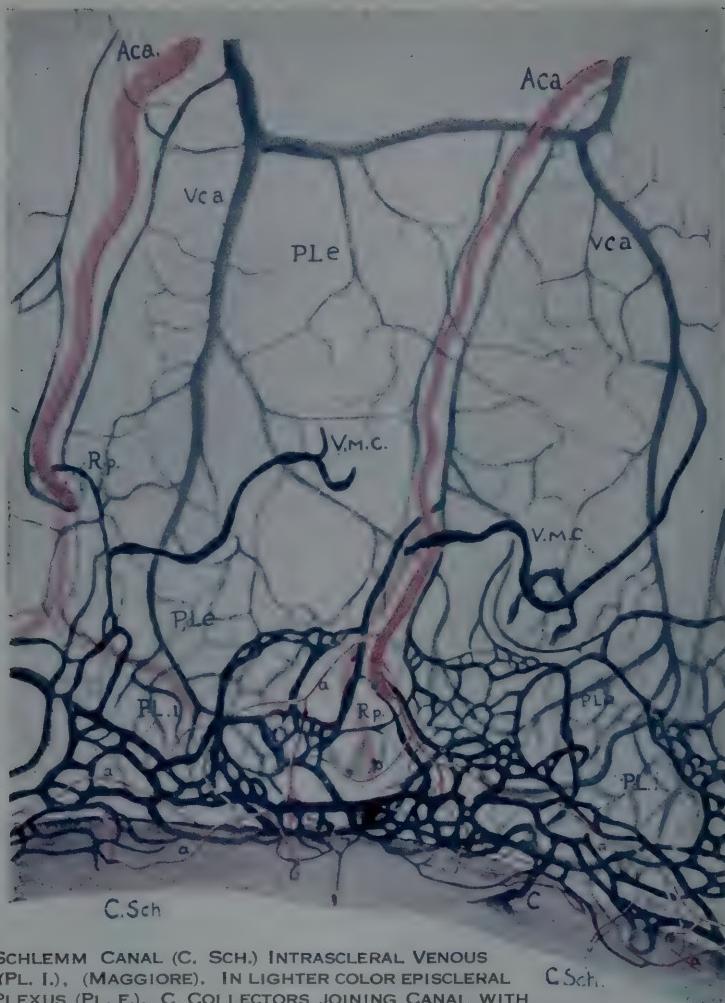


FIG. 1. SCHLEMM CANAL (C. SCH.) INTRASCLERAL VENOUS PLEXUS (PL. I.), (MAGGIORE). IN LIGHTER COLOR EPISCERAL C.Sch. VENOUS PLEXUS (PL. E.). C COLLECTORS JOINING CANAL WITH PLEXUS. A. ARTERIES OF PLEXUS. A.C.A. ANTERIOR CILIARY ARTERY. V.CA. ANTERIOR CILIARY VEIN. V.M.C. VEINS OF THE CILIARY MUSCLE.

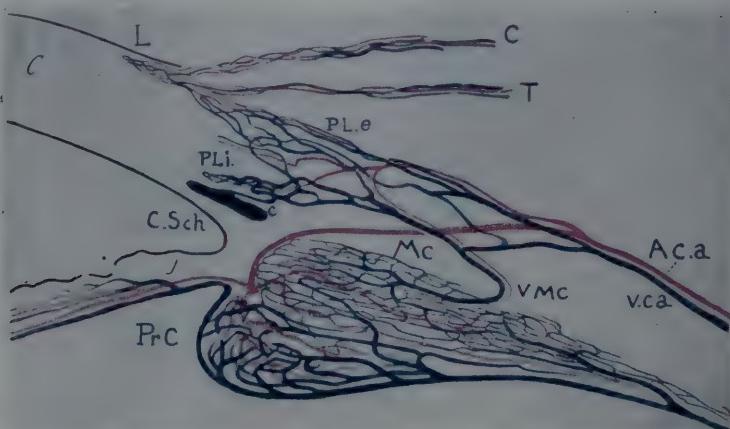


FIG. 2. DIAGRAM FROM MICROSCOPIC SERIAL SECTIONS ADULT HUMAN EYE. SHOWS RELATIONS OF PLEXES: C, CONJUNCTIVAL; T, OF TENON CAPSULE; PL.E. EPISCERAL AND PL.I. INTRASCLERAL. C, CORNEA. L, LIMBUS. C.SCH. SCHLEMM CANAL. C, COLLECTOR. A.CA., V.CA, ANTERIOR CILIARY ARTERY AND VEIN. V.M.C. VEIN FROM THE CILIARY BODY. MC, CILIARY MUSCLE. PR.C, CILIARY PROCESSES. (MAGGIORE.)

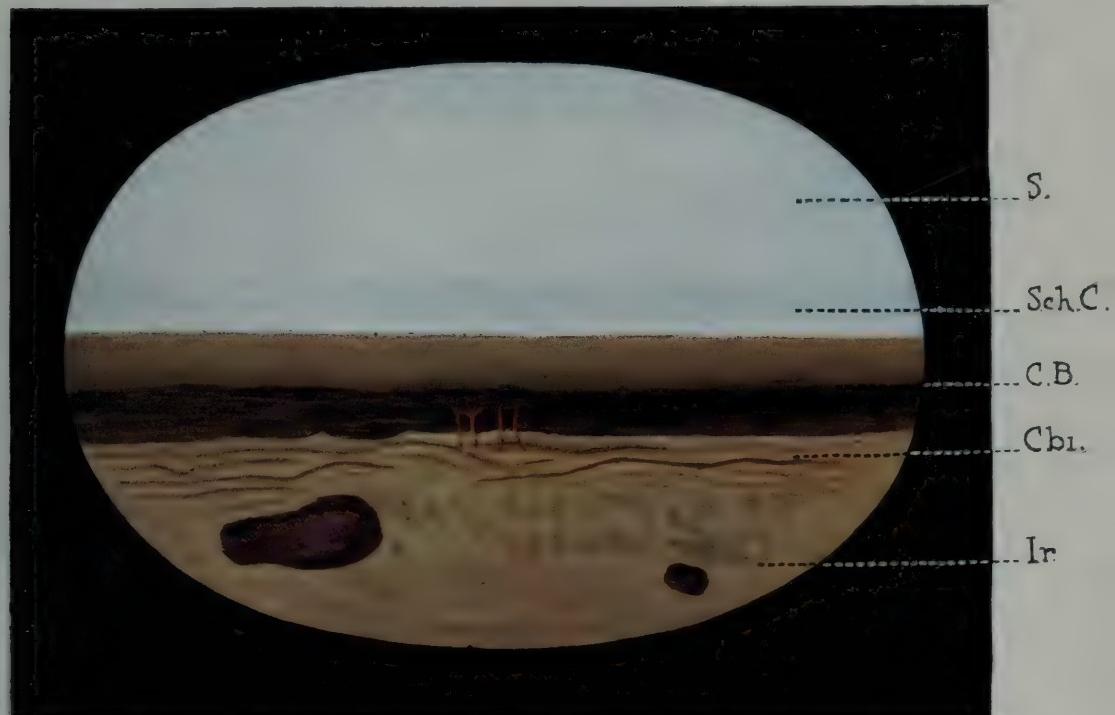


FIG. 5. ANGLE OF THE ANTERIOR CHAMBER IN KERATOGLOBUS, BY DIRECT OPHTHALMOSCOPIC EX-
AMINATION. IR, IRIS; CBI, CILIARY BORDER OF THE IRIS. C.B., CILIARY BODY. SCH.C.,
SCLERO-CORNEAL TRABECULUM BEHIND WHICH LIES SCHLEMM CANAL. S., INNER SUR-
FACE OF SCLERA. URIBE TRONCOSO.

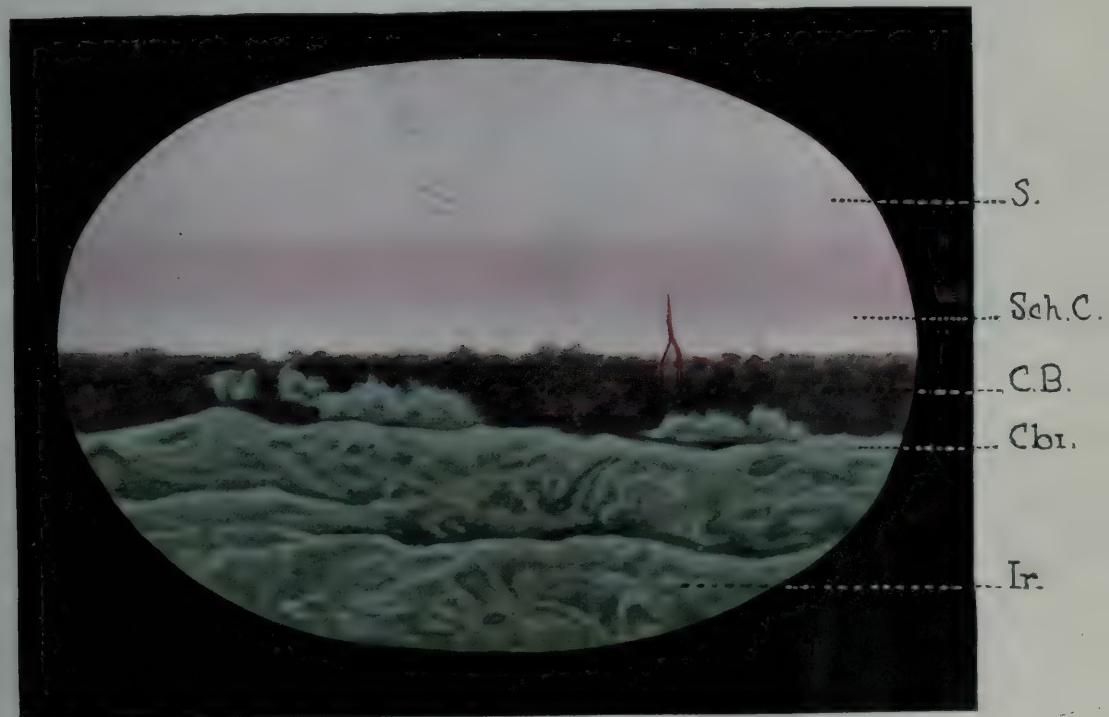


FIG. 6. ANGLE OF THE ANTERIOR CHAMBER (SALZMANN). CASE OF TUBERCULOUS IRRITIS WITH THE
SCHLEMM CANAL FILLED WITH DILUTED BLOOD. LETTERS HAVE SAME MEANING AS IN FIG. 5.

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THE PHYSIOLOGIC NATURE OF THE SCHLEMM CANAL.

M. URIBE-TRONCOSO, M.D.

NEW YORK.

This paper reviews the various investigations regarding the function of Schlemm's canal, and summarizes the proof that it is normally a lymph space, rarely containing any blood.

There is a small region in the eye, which has attracted the attention of ophthalmologists since the middle of the last century, being the prolific source of many interesting researches and still more divergent opinions. This region is the angle of the anterior chamber, with its two important structures: the pectinate ligament, and the Schlemm canal.

Concealed in the living eye by the opaque edge of the sclera, the sclero-corneal angle was, until very recently, out of reach by our instruments and the different methods of examination. Its principal organ, the Schlemm canal, altho perfectly described from the anatomic standpoint, was falsely construed from the physiologic; and its exact nature asserted only by suppositions, or by imperfectly drawn conclusions from animal experimentation.

The prevalent view in ophthalmology today is to consider the Schlemm canal a venous sinus. Such opinion was set forth and strongly supported by Leber,¹ since 1873 as a result of his experimental work and his studies in comparative anatomy of the angle in animals and men. Leber described the Schlemm canal as a closed venous plexus, entirely similar in character to the sinuses of the dura mater.

However, a former opinion sustained by Schwalbe² as far back as 1869, considered the canal as a lymphatic vessel. He reached this conclusion in the course of his researches on the ocular lymphatics, by using injections of Berlin blue in the anterior chamber.

The colored matter not only filled the meshes of the pectinate ligament, but also penetrated into the Schlemm canal, and thence into the scleral venous branches, escaping out of the eye by the anterior ciliary veins. Schwalbe concluded that a free communication existed between the anterior chamber and the canal, whose inner wall was provided with stomata or apertures.

With this idea Leber strongly disagreed, and with new researches was able to demonstrate that nondiffusible coloring matters penetrated into the Schlemm canal, not by preexisting openings, but thru tearings in the inner wall made by the pressure of the injection; this wall being a continuous osmotic membrane thru which only diffusible substances could pass.

A protracted and confusing controversy followed, many observers taking sides with Schwalbe and others with Leber. At last Schwalbe himself, Waldeyer and Gutmann relinquished their former views, and accepted the venous nature of the sinus.³

Strange to say, strong arguments such as the anatomic structure of the canal, and the almost total absence of red blood corpuscles in its lumen, as observed in microscopic sections of dead eyes were disposed of, and explained in different ways.

The idea of the venous nature of the Schlemm canal was almost universally accepted in science, when in 1909, as a result of physiologic investigations conducted on the filtration of the fluids of the eye thru the angle, the author arrived at the conclusion⁴ that

its contents were entirely of lymphatic origin, the lumen being filled, under physiologic conditions, by the aqueous, and only entered by blood coming from the anterior ciliary veins, when the general blood pressure was increased to such an extent, that the normal barriers were overcome. In a second paper,⁵ published in 1914, the same idea was supported by new experimental facts and physiologic considerations.

Some brief explanations of the anatomic relationship between the canal and the venous network inside of the sclera, and in the episclera, around the limbus, are necessary, in order to convey an accurate idea of the basis and significance of my experiments.

In this description I will emphasize some new points recently brought out by Dr. L. Maggiore, of Rome, in his important monograph on the Schlemm canal, which has settled some doubtful or imperfectly known facts.⁶

The Schlemm canal is a plexiform organ, differing from veins by the complete absence of a proper wall; the canal and the tubes starting from it being formed only by an endothelial layer enclosed between the scleral fibres. It is annexed, according to Maggiore, to a large closed vascular plexus (Fig. 1), running inside of the limbus and formed almost entirely by venous branches, altho there are some fine arteries and capillaries. See Color Plate VI.

This intrascleral venous plexus ends in a few larger branches, which perforate the sclera near the margin of the cornea, and empty into the episcleral plexus. On the other hand the anterior ciliary veins perforate the sclera further back and empty into the same episcleral network, but previously receiving a few branches from the intrascleral, pericorneal plexus (Fig. 2, Color Plate VI).

The intrascleral plexus was first described by Maggiore, the old conception being of almost straight venous branches crossing the sclera and connecting with the canal by small fine recurrent branches. The same author lays stress especially on the relations

of the small trunks joining the canal itself with the venous plexus. These he calls "collectors," and describes them as being of a conical shape arising by a large base from the anterior surface or convex margin of the canal, generally in a slanting way, each to run a short course and end by its apex in the intrascleral plexus, with which they join also in an oblique manner, sometimes even forming small hooks. These collectors, scarce in number,—about 20 in all,—are merely fissures between the scleral fibres, with a virtual lumen, and could be seen only with high magnifications, or in cases in which there are present inside some red blood corpuscles.

I have alluded in my former papers to the very small size of these "collectors," whose caliber, according to Schwalbe, is only 0.024 mm., showing the great difficulty the blood from the veins must experience in penetrating the canal. In fact they act as valves, preventing the blood from coming into the canal when the general blood pressure is normal.

I wish to emphasize the fact, also set forth by Thomson Henderson, that all the perforating venous branches, especially those around the cornea which belong to the intrascleral network, are in communication with the Schlemm canal, either directly or indirectly, a fact of great physiologic significance.

As may be concluded from its anatomic characteristics and vascular connections, the Schlemm canal is a well differentiated organ in man, while in animals its position, shape, relations, and number of vascular channels varies greatly.

The monkey's angle is the most similar to man. In the rabbit, which is the animal almost always used in experimental work, it differs principally by the great importance of the Fontana spaces, whose cavities are very wide and form a true large lymphatic canal, situated in the angle between the sclero-cornea and the ciliary body, and separated in part from the anterior chamber by the suspensory ligament of the lens. This canal, filled

with aqueous, takes, probably from a physiologic standpoint, the place of the Schlemm channel in men, and is in relation with the episcleral vascular network by many small vessels, some of which are placed between the scleral fibers in the normal place of the Schlemm canal in man, and afterward perforate the sclera near the limbus.

The meshes of the pectinate ligament play in regard to these vessels,



Fig. 3.—Filtration in a rabbit's eye isolated by an impermeable membrane and immersed in a glass cup filled with olive oil. Large blood clots with lymph at the lower ends can be seen on both sides of the limbus; also clear droplets and a large, clear drop coming from the other side of the limbus and staying in the apex of the cornea. In the lower part of the cup some blood and fluid have collected in the straight tube.

and those of the ciliary body, probably the same protective role which the sclero-corneal trabeculum plays in man, stopping all foreign matter, pigment granulations, corpuscles, exudates, etc., which may impair the osmotic filtration qualities of these vascular membranes.

In the course of a series of experiments primarily intended to demonstrate the continuous filtration of ocular fluids in the living eye, and determining its amount,⁴ I found that all these perforating vessels near the edge of the cornea conveyed a liquid so poor in red blood corpuscles, as to be readily considered as lymphatic channels.

The technic of these experiments is as follows: After cleansing and cocaineizing the conjunctival sac in a

living rabbit, fastened to an anatomic board, the conjunctiva is cut around the cornea, exactly at its insertion to the limbus, and dissected as far back as the equator, just as it is done for enucleation, leaving the sclera well exposed. The globe is then secured with a forceps grasping the superior rectus and slowly drawn out of its socket, until the anterior segment is out of the orbit.

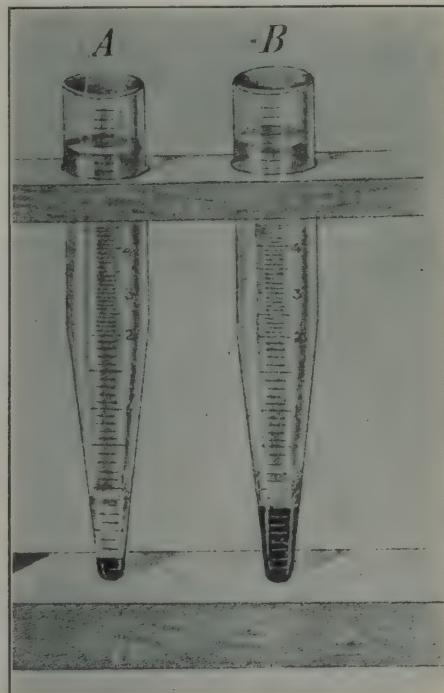


Fig. 4.—Comparative relation between the constituents of the filtrate from the eye A, and pure blood taken from the rabbit's ear, B; after centrifugation.

In order to hold it in this position, both lids are rolled inside between the globe and the orbit, and if necessary kept in position by a stitch made in the outer canthus. The animal is then turned on the side in a vertical position, in such a way that the apex of the cornea shall be the lowest point of the eye. The globe is then made to pass thru a hole in a piece of rubber-dam sheet, to avoid all liquids from the conjunctiva or orbit coming in contact with the eye; the sclera is mopped of all the blood and clots, and the globe

immersed until near the equator, into a glass cup filled with olive oil. (Fig. 3.)

In this way all the liquids coming from the sectioned perforating ciliary vessels, and from the veins of the intrascleral network around the limbus, fall in the oil, can be collected, exactly measured, and their true nature ascertained. From all the cut vascular tubes near the limbus leaks a clear, almost transparent liquid, which collects in droplets slightly colored by the blood. From the large trunks of the anterior ciliary vessels blood comes out at first, coagulates and gives way then to a clear lymph. After experiments lasting from a half to one hour, the centrifugated oil gives a small clot and a large quantity of a clear liquid, which can be compared (Fig. 4) with a similar amount of blood taken from the ear of the rabbit, and the exact proportions of the clot and serum in the filtrate calculated; the rest being pure lymph; that is aqueous humor.

Should the Schlemm canal be a venous sinus as Leber believed, only blood should be found in the filtrate, in the same way that if a faucet is opened or a pipe cut thru, the liquid which filled the latter, and no other, will come out. All the veins of the episcleral plexus being in communication with the Schlemm canal as pointed out, only blood should come out thru their cut ends. If, on the contrary, a clear transparent fluid flows out from these cut vessels, this fact authorizes us to consider the Schlemm canal as a lymphatic space.

This clear liquid comes out continually, and its rate can be calculated at an average of 3.5 c.mm. in a minute.

The term "filtration" was used by Leber, to indicate that the aqueous did not pass thru the inner wall into the lumen of the Schlemm canal by simple osmosis, but as a result of the greater pressure on one side of this membrane, produced by the intraocular tension.

Hamburger has brought forward recently some objections to my experiments, pointing out that the subluxation of the globe out of the socket changes the venous and capillary cir-

culation. But even in this case, the result of the subluxation could only be a congestion of the eye that will draw more blood to the intrascleral plexus and will cause a greater output of blood into the oil, but never can produce the exit of a different kind of fluid as the lymph, around the limbus.

In order to meet some other criticisms of Weiss, I made a new series of experiments in 1914, studying for the sake of comparison, the lymphatic circulation of the testicle in its different layers, by the same method of immersion in oil. Its results were very interesting showing that the subcutaneous and muscular tissues have a very slow lymphatic output amounting only, in the rabbit, to 0.06 c.mm. in a minute, whereas the serous membrane gave an average of 3.6 c.mm. in a minute, an amount very similar to that found for the eye. This shows the close physiologic relationship between the chambers of the eye and the serous cavities, a homology which is still proved by the pathologic reactions, similar in both cases.⁵

In 1917 Dr. L. Maggiore published the important monograph, quoted above, on the Schlemm canal. He was able to prove that from the morphologic point of view, the canal has not the structure of a vein, but special characteristics which make it resemble closely a lymphatic vessel. He was able, also, to corroborate the classic opinion that the inner wall of the Schlemm canal, toward the anterior chamber, is a continuous membrane and has no stomata or openings.

Direct observation of the region of the angle in living eyes from outside thru a thin sclera, was first undertaken by Fuchs in 1900, using a very strong light. He saw a dark ring concentric to the cornea with well defined margins, and concluded that the canal was filled with blood corpuscles.

Maggiore trying to repeat Fuchs' experiments under similar conditions, never succeeded in seeing the ring, and denies any value to this method.

Direct observation of the iridocorneal angle from inside was, of course, the better way of solving the

physiologic problem. This examination was first undertaken by Dr. Trantas, in 1907, using the indirect and direct methods of ophthalmoscopy in a lateral position, tangent to the iris and pressing with the finger upon the eye, thru the lid, in the corresponding region. In this way he succeeded in observing the root of the iris and the internal part of the sclera, the latter as a white bright zone. Inside of the dilated pupil he could see the ciliary processes. The examination of the angle, however, was possible only in eyes with very deep anterior chamber, such as cases of keratoglobus, or in high myopia.

A great advance in the same direction was made by Salzmann⁸ in 1914, using a contact glass upon the cornea, and observing with the ophthalmoscope, by indirect and direct methods. To him belongs the credit of having solved the problem of observing the iridocorneal angle in living eyes thru the anterior chamber, giving an accurate description of its structures and behavior in normal and in pathologic cases. In a second contribution⁹ of July, 1915, he completed and perfected his methods, and devised a new contact glass instead of Fick's used before.

Altho a keen observer himself, Salzmann being imbued with Leber's ideas, had expected at first to see a broad red colored ring at the place of Schlemm's canal. He did not, and in his first paper declared the canal to be invisible, being probably concealed by the thickness of the sclero-corneal trabeculum. In his second paper, however, he modified his former views and positively admitted the Schlemm canal contained a clear, colorless liquid, and only in exceptional cases diluted blood. He was led to this conclusion by the observation of cases in which thru hyperemia of the pericorneal vascular network, or by pathologic conditions, there was clearly visible a rosy coloration near the ciliary body, in the anatomic situation of the canal.

This could not be possible if the trabeculum were so thick as to conceal the vessel behind. But even in these cases there was no question of the con-

tents being pure blood, as the color was totally different from the dark red hue of the small vessels sometimes seen in the root of the iris. The blood made itself apparent, especially by a sharp rosy coloration in the anterior edge of the canal.

Salzmann's observations have been very recently confirmed by Prof. L. Koeppe,¹⁰ of Halle, who by perfecting the technic, and as a part of his important discovery of the microscopic examination of the living eye, has made possible the observation of the iridocorneal angle with high magnifications.

He used the focal illumination of the Nernst-Gullstrand slit lamp, and observed the region thru the new Zeiss binocular apparatus called "Bitumi" for indirect and "Orthobitumi" for direct examination, giving a magnification of 40 diameters. With this instrument a stereoscopic image of the angle is obtained and by using a contact glass and a direct, indirect, or oscillatory light, all the microscopic structures of the angle can be perfectly recorded.

Koeppe also describes the Schlemm canal as a clear zone, slightly darker than the inner border of the sclera, filled with a clear liquid. Even in cases of glaucoma, this zone was not found of a red color. On the other hand, small vessels, and remnants of blood showed the characteristic red tint.

In the accompanying picture (Fig. 4) I have drawn from a case of keratoglobus especially suitable for examination without any contact glass. The angle seen by direct ophthalmoscopic examination is formed by two different parts, a colored and a white one. The colored area has two portions: a yellow flat one, the anterior surface of the iris extending to its ciliary border; and the ciliary body itself (of a brownish color), situated at a deeper level and forming the angle proper, which inserts in the inner part of the sclera by a continuous, generally ragged line.

The white zone is sometimes separated from the ciliary body by a brilliant, white, narrow line, which corre-

sponds to the scleral spur. Then comes a broad bluish-white band, the sclero-corneal trabeculum, which covers the Schlemm canal, and is sharply limited outside by a darker or brighter line, but sometimes can not be differentiated from the rest of the sclera.

Farther away from the Schlemm canal the inner surface of the sclera shows a brilliant white color, until it reaches the edge of the cornea.

In Fig. 5 (taken from Salzmann)

and occurring in a patient with tubercular iritis, the Schlemm canal has a reddish coloration, the lumen being filled with diluted blood.

Thus by direct examination of the region of the angle, heretofore entirely concealed to our own eyes, the problem of the true nature of the Schlemm canal, already solved by physiologic research, has been settled, and its lymphatic character asserted beyond doubt.

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ON FIXATION. A KINDERGARTEN EXERCISE IN OPHTHALMIC TECHNIC.

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Various methods of fixing the eyeball for operations upon it are here described and their relative advantages discussed. The importance of considering minute details in regard to operative technic is thus brought out.

To fix the eyeball properly for various ophthalmic operations is a very essential bit of technic. For the ordinary *cataract incision* it is obvious that no one point of fixation can be equally good both for the puncture and the cut. For the former, the fixation is best applied at the side; while for the cut-

To fix for an incision with a spade knife, or for any of the filtration *operations for glaucoma*, it seems clear that the superior rectus offers the most favorable point. Obvious as this appears to be, the use of the upper tendon for this purpose seems to be rather uncommon. In fact the great majority of men to

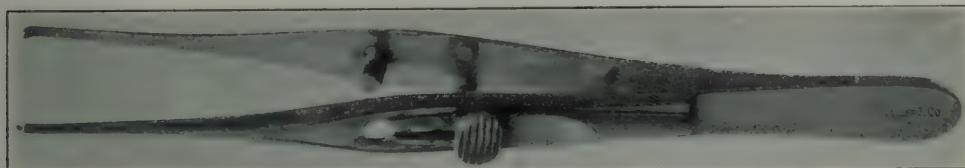


Fig. 1.—Forceps used for fixation by seizing rectus tendon.

ting up, the fixation in the vertical line is desirable. The difficulty of achieving accuracy in the puncture and counterpuncture is, however, so much greater than that of finishing the cut, that the writer many years ago gave up fixation at a point below the cornea and since then has fixed by a firm grasp on the internal rectus tendon.

It is probable that this method would be in general use if it were not for the fact that most operators feel that they must have some means of holding the eyeball down if the patient tries to look up. If, however, the globe is thoroughly cocainized with a 10 per cent solution applied four or five times in the course of half an hour, or by the injection of a drop or two of 4 per cent cocaine four minutes before the operation is begun, the necessity for holding the eyeball down will seldom be felt. Fixing by the internal tendon applies the steadyng force in the line almost directly opposite the puncture and counterpuncture, while with fixation above or below the globe tends to be pushed away, and rotated around a center furnished by the point of fixation.

whom I have mentioned it have never tried it. With the tendon firmly grasped by some such forceps (as that in Fig. 1) with three projecting teeth and a slide catch, the weight of the forceps holds the globe down (as in Fig. 2); so that the operator can have both hands free for other work.

Useful as this method is for operations under cocaine, it is even more so for trephinnings and iridectomies under a general anesthetic. This, however, does not offer as good fixation for an ordinary cataract incision as fixation by the internal rectus, so that in operations for senile cataract under a general anesthetic the best plan is to fix both by the superior and the internal rectus tendons (Fig. 3). This double fixation is also the best means of bringing forward a sunken eyeball for a cataract operation; altho the single fixation by the internal rectus answers fairly well for this purpose.

One of the most important steps in an *advancement operation* is to take a firm hold of the tendon and maintain this hold even if the tendon has to be cut behind it, until all sutures which pierce

the sclera in lines parallel to the muscle are passed. The tendon fixation for this purpose serves better than any scleral forceps which the writer has seen.

For removing small malignant *tumors* a thread thru one border of the tumor plainly offers advantages over an attempt to fix with forceps; both because



Fig 2.—Fixation of eyeball by grasping tendon of superior rectus.

Where, on the other hand, the scleral sutures are to be introduced at right angles to the length of the muscle, the "spit" of Pamard, or better yet the fixation fork of Wells, gives better service.

Fixation by a strong thread can be used with advantage in a number of ophthalmic operations. At the end of an *enucleation* a thread passed thru the sclera enables the operator to hold the optic nerve on the stretch so as to materially facilitate the division of the nerve as far back as may be desired.

it is less likely to tear out and because it obviates the chance of inoculating the sound tissue with forceps which have been used on the tumor.

For all tumors within the orbit, the thread fixation is a great help. When, on making an exploratory incision into the orbit a tumor is encountered, the best plan if there is the slightest doubt as to its nature, is to fix it with a strong thread before puncturing it to determine whether it may not be a *cyst* which can be evacuated and cured with carbolic

acid or trichloracetic acid without being extirpated. If a cyst is punctured before being fixed it may collapse so that it can not be relocated without doing un-

else. Recently, Coppez,¹ has advised fixing by both the superior and internal tendons as a regular thing in senile cataract operations. It does, as he says, give the



Fig. 3.—Double fixation of eyeball by hold on superior rectus and internal rectus.

necessary damage. If it be not a cyst, the tension which can be kept up with a thread is generally decidedly superior to that furnished by anything but strong vulsellum forceps which are apt to mangle the specimen unnecessarily.

Fixation by the superior tendon was long ago recommended by Angelucci, but until recently I had not seen any account of the use of double fixation by anyone

most complete control over the eyeball, but the control given by the internal tendon alone is so good that I have not found it necessary to use the double fixation except in general anesthesia, or where the eye is sunken or where the patient is very unruly. Perlmann² also has recently recommended a double forceps with which to fix by the superior and inferior tendons when operating for senile cataract. See p. 362.

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A STUDY OF THE ETIOLOGY OF PERIODIC OPHTHALMIA IN HORSES.

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Although the results of this study are negative, they narrow the field in which the cause of this disease is to be sought. Ordinary contagion is excluded, and the assumption raised that an organism causing it must enter the horse through some intermediary as does the malarial parasite; or the eye lesions is connected with some distant focus of disease, as in onchocercosis; or that the disease is metabolic in origin. Read before the St. Louis Ophthalmic Conference, May 14, 1920.

During the summer of 1916, periodic ophthalmia began to be prevalent among the horses of the British Expeditionary Forces. No. 19 veterinary hospital at Rouen was designated as one of the special hospitals for this disease; and it was there, thru the courtesy of the commanding officers, first Major Hodge and later Captain Stewart, that this study was made. Much of the work was performed by Captain Torrence and Captain Gofton, without whose aid this study would have been impossible.

The clinical picture identifies this epidemic with the disease described best by Bouley and Reynal¹ in 1862 under the name of "Fluxion Periodique".

When first seen by us, there was almost invariably marked photophobia, a red and swollen conjunctiva discharging profusely a mucopurulent secretion. The cornea was very hazy, in some cases being definitely opaque. This was due to an interstitial keratitis, there being no ulceration in any of the cases we observed. There was present marked circumcorneal injection and a plastic iritis, the pupil early being occluded, a gray or hemorrhagic exudate filling the pupillary space. Branching vessels extended 3 to 5 millimeters from the conjunctiva into the cornea. In every case where the vitreous could be seen, there were opacities. Both eyes were usually affected, one beginning about two weeks after the other.

Gradually the secretion would disappear, the photophobia and corneal opacity grow less and the eye become quiet. The keratitis practically always disappeared entirely. Vitreous opacities, occasional iris ad-

hesions and somewhat impaired vision were the obvious relics of the disturbance. The optic nerve was normal in the cases which we observed. Others have described optic atrophy and detachment of the retina. We did not observe either of these results in any of our cases. This, however, may be due to the fact that we seldom saw very late cases; as all such had previously been weeded out, and evacuated to areas further from the line than where we were stationed.

After six to twelve weeks these horses were returned to work. Though we could not often follow the individual horse, we were able to determine that recurrences were common (usually in three to six months), each attack being worse than the previous one. The ultimate result was, in many cases, blindness.

We decided to confine ourselves to a determination, if possible, of the transmissibility of the disease.

The conjunctival secretion was examined by Dr. Eugene Opie and many organisms were found, chiefly staphylococcus aureus and a gram negative diphtheroid organism. This latter was isolated and unavailing efforts made to reproduce the conjunctivitis with it. The secretion from diseased eyes was placed in normal conjunctival sacs, but in no case was a conjunctivitis produced. The same experiment was repeated after making abrasions in the healthy conjunctiva, but with negative results.

Thinking that possibly the disease was acquired from occupancy of an infected stall, two healthy horses were kept for two months in stalls which had been used for many weeks for horses infected with ophthalmia. The

disease did not develop. On the other hand one horse which had been isolated in a clean stall for two months while in the hospital for pneumonia did develop ophthalmia.

Aqueous and vitreous humors, obtained aseptically from diseased eyes, were found sterile. Agar-agar, blood serum agar, glucose, gelatin and bouillon were used. Anaerobic cultures also were tried unsuccessfully. Aqueous fluid showed red blood cells; and in one specimen a coccus, probably a contamination. No organisms were seen by dark field illumination. Aqueous from acute cases was introduced into the anterior chambers of two horses. One horse was kept under ideal conditions and the other was kept in a foul, ill-lighted stable. Altho, in the latter case, certain changes were noted and the recovery was much less rapid than in the former, we could not say that the disease was reproduced. This is contrary to the findings of R. Avery,² who reports transmission of the disease in this manner.

In four cases, pieces of irides were removed aseptically from ophthalmia cases, and placed in the anterior chamber of healthy eyes. Reactions, suggestive of the disease, but not typical of it, were produced.

Blood was withdrawn from the jugular vein of two horses with the disease and cultures were made on agar and glucose and bouillon. Nothing grew from either specimen.

Fifteen cc. of blood were taken from a horse with ophthalmia and inoculated into the jugular of a well horse with no result. Thinking that perhaps an insufficient amount of blood had been used, two further transfusions were made, one of 50 cc. and one of 75 cc., each case being taken from a different horse with the disease and inoculated into a well horse. The disease was not reproduced.

Hoping that the blood might show something when examined, fresh specimens were studied but revealed no abnormalities.

A differential count with hematoxylin and eosin stain gave:

Polymorphonuclear neutrophilic leucocytes	87=60%
Large mononuclears	18=12%
Small mononuclears	32=24%
Poly. eosinophil. nuclears.....	7= 5%

In one experiment of transplanting iris, we were pleased to find that the iris came freely off from the lens capsule and hoped that in old quiet eyes when the pupil was occluded, an iridectomy might give useful vision. Altho we were able to perform the operation successfully in a few cases, we invariably found that the vitreous was so full of opacities that no visual improvement was obtained.

We used at different times three treatments.

1. Lugol's injection.
2. Subconjunctival saline injections.
3. Atropin and silver nitrat.

Captain Torrence tried, in a series of cases, the procedure of Wiggs,³ of injecting Lugol's solution deep into the orbit, but on the average the improvement was no greater in the eyes so treated than in the control eyes. Subconjunctival injections were tried in twenty cases, 5% saline being used, but no marked benefit was noted. We found the most effective treatment to be the early and prolonged use of atropin and silver nitrat.

Autopsies were made on a small number of horses having this disease. Only one showed pathologic changes in parts other than the eyes. This one had pus in the nasal accessory sinuses. One horse had spinal disease clinically but there was no change in the gross specimen, pathologically.

In conclusion, we believe that our work presents a certain amount of evidence against the theory of direct contagion in this disease.

CASE HISTORIES.

October 1, 1917, to November 15, 1917. Two horses with normal eyes were placed in ophthalmia wards where they were in stalls previously occupied by horses with ophthalmia and were in flank contact with horses which had active forms of the disease. One horse was exposed thus for five

weeks and the other for six weeks. The disease did not develop.

EXPERIMENTS WITH AQUEOUS FROM INFECTED EYES.

February 11, 1918. 1 c.c. of aqueous obtained by puncture thru the cornea near the limbus with a hypodermic needle in a case of acute ophthalmia, was introduced into the anterior chamber of a normal horse "A" which was then placed in a well lighted, well ventilated stable.

1 c.c. from same case of ophthalmia was placed in the anterior chamber of a normal horse "B" which was placed in a dark foul stable.

February 12, 1918. "A" Slight general steaminess of cornea, most marked around puncture wound. Photophobia and lacrimation. "B" Same as "A." February 13, 1918 "A" Less steaminess of cornea and no other signs of disease. "B" Increased steaminess of cornea. Small amount of blood in lower half of cornea and three flocculi in anterior chamber below pupil; marked photophobia and lacrimation. February 14, 1918. "A" Very slight corneal steaminess, no photophobia, slight lacrimation, conjunctivitis. "B" Increased and now marked conjunctivitis, lacrimation, and photophobia. Pupil narrow, reacts only slightly to light, aqueous muddy below lower pupillary margin, containing small flakes of albumin, very little hemorrhage (less than on the 13th). Slightly less corneal clouding. No vascularization of cornea. February 15, 1918. "A" Well. "B" Conjunctivitis, lacrimation, and photophobia less. Precipitate in anterior chamber is higher, and now appears as a jelly-like mass which can be moved freely about in anterior chamber by pressure on the cornea. Less steaminess of cornea and condition looks less like ophthalmia. February 17, 1918. "B" Only slight corneal steaminess and the precipitate in anterior chamber remain as abnormalities. February 26, 1918. "B" Still small amount of precipitate in anterior chamber. Eye quiet. Vitreous clear.

IMPLANTATIONS OF DISEASED IRIDES.

These experiments were performed under ether anesthesia.

EXPERIMENT 1. January 19, 1918. Iris from acute case of ophthalmia introduced into the anterior chamber of a normal horse thru linear incision, left eye. Much bleeding. January 22, conjunctiva slightly injected. Mucopurulent discharge from inner canthus. Iritis. Upper one-third of inflamed iris can be seen. Pupil and remainder of iris obscured by hyphemia. Pupillary slit distinctly seen, appears to be closed. January 23. Hyphemia rapidly disappearing. Pupil visible and slit like, but nature of vitreous not discernible. Less discharge and less photophobia. Appears today less like a developing ophthalmia. January 24. Less hyphemia. Pupil visible, narrow. Corpora nigra has increased in size and extends almost across pupil. Probable fibrinous exudate in lowest part of anterior chamber with blood above it. Vitreous cannot yet be seen. January 25. Steaminess around outer rim of cornea extending 5 mm. towards center. Slight circumcorneal injection and definite fibrinous exudate in anterior chamber. Less hyphemia. Pupil more contracted. Contents of vitreous chamber cannot yet be seen. January 27. Steaminess of cornea limited strictly to periphery. Appearance as of the 25th. Three pigment deposits on anterior lens capsule. Cannot make out condition of vitreous. January 28. Injection in region of scar more marked. Inflammation decreasing. Pupil more open. Structure of retina distinguishable, but slightly hazy. January 30. Pupil reacts to light. Structure of retina fairly clear. Disc appears as a pink blur. Whole condition looks less acute. Peripheral cloudiness about gone. Only slight injection remains and this near the scar of the incision. February 1. Whole eye better. Pupil much more dilated, reacts actively to light. Optic disc a pink blur and vessels difficult to distinguish. Three pigment spots on anterior lens capsule. February 3. No change. February 4. Iris smoother

and paler than normal, but much of its lustre has been regained. Retinal vessels still hazy. February 5. No change. February 9. Today there can be seen a definite vitreous haze composed of minute particles, lying for the most part anteriorly and in lower half of vitreous. This accounts for haziness of vessels of disc. February 14. External appearance normal.

EXPERIMENT 2. January 18, 1918. Piece of iris from an acute case of ophthalmia was inserted into the anterior chamber of right eye of a normal horse. (Keratome incision, aseptic operation, ether.) January 30. Foreign iris can be plainly seen on the iris close to the scar. There are a few blood clots and there is cloudiness of the cornea in the immediate vicinity of the incision. Pupil narrow and details of retina cannot be made out. Iris looks normal. January 31. No change. February 1. No change. February 2. Cloudiness of cornea much less marked in the region of the introduced iris and only one very small blood clot unab-sorbed. Photophobia marked and fairly profuse flow of mucoid material from conjunctiva. Normal retina can be distinguished thru a narrow pupil which reacts to light. February 3. Photophobia more marked. Secretion as yesterday. Conjunctiva swollen and injected. Whole iris seems affected, presenting fawn colored appearance with loss of the crypts. Pupil does not react to light. April 2. Photophobia, lids swollen, mild iritis. Retinal structure fairly clear. Edge of optic disc can be seen and vessels are a little hazy. Pupil reacts to light and the general appearance of the eye is

better. May 2. No change. Discharge continues. July 2. Better, less conjunctivitis and discharge. Iris normal, reacts actively to light. Corneal opacity around introduced pieces of iris almost gone. September 2. Except for slight inflammation of the conjunctiva and slight photophobia the eye is normal.

EXPERIMENT 3. January 29, 1918. Piece of iris removed from an acute case of ophthalmia was introduced into the anterior chamber of a normal horse. Ether. January 30. Blood clot hanging around corpora nigra. Pupil contracted. Iris has lost its lustre. Marked cloudiness around scar. January 31. Peripheral keratitis with injection around scar. Pupil contracts. Retina seems normal but only a poor view is obtained through the contracted pupil. February 1. One end of clot has become detached from corpora nigra and is stretched across the pupil. Cloudiness of cornea seems to be extending centrally. February 2. Remains of blood clot lying in deepest part of anterior chamber. Peripheral opacity of cornea less marked. Retina normal. Very sluggish reaction of pupil to light. February 3. Peripheral cloudiness remains; this may be due to a small tag of implanted iris remaining in the lips of the wound. Structure of retina clear except for a slight haziness of vessels around the disc. Pupil reacts readily to light. Whole eye much improved. February 4. Still some injection and cloudiness around incision. February 5. Same as on 4th. February 7. Better. Peripheral steaminess gone. Slight general corneal haze. Injection about incision almost gone.

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THE INTRAOCULAR FOREIGN BODY, A SURGICAL OCULAR EMERGENCY.

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The importance of early diagnosis and extraction of magnetic foreign bodies, using the magnet without waiting for X-ray diagnosis in recent injuries is urged. Magnet extraction thru the anterior chamber, rather than by scleral incision is preferred. Read before the New England Ophthalmological Society, January 18, 1921.

Experience with penetrating foreign bodies, during a number of years' service at the Massachusetts Charitable Eye and Ear Infirmary and in France during the war, has led the writer to certain views regarding the handling of such cases, the expression of which it is hoped may be of some benefit to those men who are starting in on their career in ophthalmology and to those others who perhaps see only rarely cases of this description. In this brief note the intention is only to lay stress on a few important points which on occasions do not always seem to be taken into consideration.

It should be recognized first of all that the prognosis is always to be considered as very grave in such injuries as these and especially when the foreign body is of any size, also when it has penetrated into the posterior portion of the eyeball. A very large number of such eyes are lost either from the trauma sustained at the time of accident, thru infection, and even after a successful extraction, thru the trauma caused by the operative procedure employed. We all know, however, that a certain percentage of cases retain a fairly useful eye, and it is in the hope that this desired result may be obtained that we should approach every case which comes into our hands.

My first thesis is, that *in every injury of the eye the possibility of an intraocular foreign body should be considered*. All suspicious cases should be regarded as positive until the negative has been proved by all the diagnostic means at our command. Too often the opposite conclusion is arrived at, and, misled by a faulty history and an innocent appearing eyeball, the physician is led to assume, without complete investigation, that the eye does not contain a foreign body.

The site of a perforation is often overlooked, sometimes thru failure to examine thoroly, and sometimes because if it be in the conjunctiva covered portion of the globe it may be so small as to escape the eye, especially in the presence of an extravasation of blood and serum. This was not infrequently the case in the many injuries seen during the war, so that it eventually became the routine procedure to consider all these cases positive until they were proven negative. It was not so very rare to find a small intraocular foreign body where careful inspection had not determined a penetrating wound.

The extraction of the magnetic foreign body should be performed as soon as possible after the injury. Any considerable delay can have only harmful results. In many cases the foreign body is infected to a greater or less degree. Where the infection is virulent the eyeball will surely be lost; but where it is less severe, early extraction will probably give the eye its best chance thru removal of the infecting agent. The earlier extraction takes place, the easier it is. The longer one waits, the more fixed in position the foreign body has become.

Early extraction requires early diagnosis. Our means of diagnosis are: the painstaking examination of the eye, the X-ray and the magnet. In many cases diagnosis may be made by the inspection of the eye and by the ophthalmoscope. Where this fails the X-ray often succeeds.

X-ray.—While recognizing the great advantage to be obtained from this method of ascertaining the presence of a foreign body in the eye, and the wonderful exactness which may be secured in the localization of the bit of steel or iron, the heretical thought sometimes comes to my mind that per-

haps at times we may be over-emphasizing its importance. Perhaps our X-ray service is not as good as that of other hospitals. Altho we have our expert on hand the whole of each morning, and plates may be taken for a part of each afternoon also, nevertheless there is a tendency to lose time waiting for X-ray reports; and what is worse, a negative report has been sometimes accepted as final evidence of the absence of the foreign body.

Unless for some reason an exact localization of the foreign body is of great importance, I do not believe that a delay of many hours is justifiable in fresh cases of foreign bodies in the eye. Where the injury is a week or more old, I do not believe that such a delay makes any great difference.

Just as a small wound in the eyeball or thru the lid may escape us, so may occasionally a small foreign body escape the X-ray. This being so, I come to my most important point—*the one indispensable test for the presence of a foreign body in the eye is the magnet*. I do not believe this point can be too strongly emphasized. Where X-ray is not available for twenty-four hours or more, I believe the diagnosis should be made by putting the patient before the magnet. This was often the case in France, the majority of wounded eyes came in during times of stress, and with perhaps a hundred or more severe injuries awaiting their turn at the X-ray, it was often manifestly impossible to get prompt service for the eye cases. The X-ray was used as an adjunct when possible, but immediate extraction was considered of more importance than localization in all but a very few instances. The necessity of rapidly moving the cases on was also a prime consideration. In extracting a foreign body an *estimate of the size* is of great importance. A fair idea of this may often be obtained from the wound of entrance, and of course the X-ray gives valuable information.

In using the magnet for diagnostic purposes it goes without saying that the patient's eye should not be brought too close to an instrument of great strength. As in extraction the smallest current that will do the work is the

best, and here we are simply trying to evoke the slightest amount of pain which will tell the story. One can often evoke a pain reaction with the hand magnet, so that when the giant magnet is used for this purpose it should be used with caution.

The *route of extraction* of an intraocular foreign body will, I suppose, always be a debatable point. On the face of it, it would seem that exact localization, posterior incision and removal with the small magnet was the simple and less complicated procedure. It would certainly appear that this route is the choice of a large majority of colleagues in this country. It was my choice also until the experience in France with the observation of a vastly larger number of cases than I had ever seen before; and *careful consideration of the two methods led me to adopt the anterior route* except in the cases of the larger foreign bodies where the lens is uninjured.

It seems beyond question that a foreign body that is not too large may be drawn around the lens into the anterior chamber without appreciable damage to the eye; and it is also beyond question that posterior puncture of the eyeball with hemorrhage and the formation of fibrous bands frequently leads to detachment of the retina. A foreign body once in the anterior chamber may be extracted without the introduction of an instrument into the eye other than the keratome with which we make the incision. Where the foreign body is so firmly fixed posteriorly that it cannot be drawn forward, I grant that exact localization and posterior incision must be employed, but this is comparatively seldom the case.

The removal of an intraocular foreign body is an operation that requires a high degree of surgical knowledge and skill, and should only be performed by those who have had the opportunity to perfect themselves. Many eyes are lost through unwise and unskillful manipulations. Wherever possible, I believe that all these cases should be referred to the hospitals which are fitted with proper equipment and whose staff is well versed in this line of work.

INJURIES TO THE EYE WITH REPORT OF 1051 CASES.

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This is an analytic account of the cases seen in a period of two years, giving the kind of history obtained, the clinical data brought out in the two classes of cases, minor injuries and major. The diagnosis including the importance of the history and the use of the X-rays is discussed. The removal of foreign bodies from inside of the eye is considered with results from twenty-four magnet extractions. The importance of early diagnosis and treatment is insisted upon.

It is common knowledge that the medical profession, in general, finds it difficult to be interested in any paper or discussion concerning the eye. This lack of interest manifests itself early, in fact, at the time we receive our first instruction in ophthalmology as medical students. One of the great reasons for this lack of interest is the absence of evident practical application in the subject matter presented.

Injuries to the eye, their proper treatment and management, will always be classed as one of the most important subjects that the oculist has in his work. In many ways it is none the less important to the medical profession in general. The object of this paper is to give a synopsis of 1051 cases of industrial injuries to the eye, which have been treated in our office in the past two years. We endeavor to emphasize those points which, to us, seem most important and of practical interest to the oculist and to the general medical profession.

In treatment of the eye, as in other branches of medicine, a good history and a carefully kept record should be the first essentials. We have taken for this series, as nearly as possible, a uniform history covering the following points:

1. When injured.
2. The type of work engaged in when injured.
3. The nature of the injury.
4. A statement concerning previous disease of the eye or eye injury; also concerning such subjective symptoms as pain, photophobia or blurring of the sight.

The vision in each eye was recorded at the time of the first visit at the of-

fice, also at later visits, and upon discharge; careful record was made of the condition found at the initial examination and of the subsequent progress of the case. We have mailed to the company employing the man injured, a copy of the original record, also a copy of the notes, made at the subsequent visits and of all X-ray and laboratory reports. When the case is closed the company has an exact duplicate of the record as it occurs in our office.

Such a scheme has many advantages, some of the most noteworthy being that it enables "the shop" to be in constant touch with the progress of the case, also to "follow up" and see that their men come regularly for treatment. It at once stimulates and maintains an interest in the case.

CLINICAL DATA.

From a study of such a series one is able to determine a number of essentially important factors in eye injury. The data accumulated will show:

1. *The type of work responsible* for the greatest number of our cases.
2. *The work offering* the greatest number of serious injuries and the converse.
3. *What per cent are seen at an early date* following the injury, and an approximate estimate of the influence this has on the recovery of the case.
4. *We will see emphasized the importance of the X-ray* in the diagnosis of metallic bodies, and the valuable assistance it affords the surgeon who is called upon to remove same.
5. *We can determine what per cent of eyes have been lost* and some of the contributing factors. These are the practical points we wish to emphasize.

In our analysis of this series we find the type of work responsible for the

TABLE OF 1051 CASES.

Type of Work When Injured	Type of Injury		X-Ray		Magnet Operation		Iridectomy		Traumatic Cataract		Eyes Enucleated	Blind eyes not enucleated
	Number of Cases and Per cent	Minor	Major	Negative	Positive	Successful	Failed	Total No. of Cases	Resulting Vision Normal	One lens dislocated		
Emery Grinding	408 or 38.8%	406	2	3	0	0	0	0	0	0	0	1
Steel, Lathe, Chisel- ing, Riveting, etc.	447 or 42.5%	389	58	80	20	19	1	21	5	16	15	6
Stone Cutting	54 or 5.1%	53	1	1	0	0	0	0	0	0	0	0
Wood Worker	36 or 3.4%	32	4	1	0	0	0	0	0	1	1	1
Glass Injury	16 or 1.5%	11	5	4	0	0	2	0	0	2	0	0
Burns, molten metal, steam, caustic, etc.	57 or 5.3%	50	7	5	0	0	0	0	0	4	1	1
Electric Flash	8 or .7%	8	0	0	0	0	0	0	0	0	0	0
Belt Injury	2 or .1%	0	2	2	0	0	0	0	0	2	0	0
Total	1051	970	81	97	20	19	1	23	5	17	24	11
Summary	92.1% of all cases were minor injuries; 7.9% were major injuries.	11.1% of all cases required an X-ray examination for removing foreign body.	95% of the magnet operations were successful in removing the iris.	23.8% had normal vision following iridectomy for prolation of the iris.	1.6% had traumatic cataracts.	3.3% of all cases were either blind or enucleated, or 43.2% of the total number of major injuries, 68.5% of the blind eye were removed.						

greatest number of our cases is seen to be the steel group, with emery grinding as a close second; the latter having just 37 cases less than the former, and the two groups together being responsible for 81.3% of all our cases. We see, therefore, that in eye injuries of this series we have patients coming from two great classes of work—those working on steel, like hammering, riveting, drilling, etc., and those working on emery.

For the purpose of study we may divide these cases into two groups: 1. *The minor injuries*; those with foreign bodies embedded in the coats of the eyeball and not perforating to the interior of the eye; nonperforating cuts and lacerations; first and second degree burns, etc. Most of the cases come in this group. 2. *The major injuries*; those in which the injury is of a more serious nature; such as perforating wounds of the eyeball with and without retained foreign bodies, third degree burns, and rupture or detachment of the coats of the eye. Of the total 1051 cases, 81 are found to come in the group of more serious or major injuries, or, in other words, 7.9% of the cases sent to our office have proven to be major injuries. This percentage is considerably lower when figured on the total number of injuries occurring in a large plant where all the cases are cared for.

The greatest number of our minor injuries occurred in the emery class, 406 cases, as compared with the next largest number, 389, in the steel group. In reality, as to the occurrence of minor injuries, there is little difference in these two classes of work, only 17 cases more occurring in the emery than in the steel. Quite the converse is true when we look at the major injuries. *Fifty-eight*, or 71% of the total number of the major injuries, are chargeable to steel work, and only two major injuries occurred in the emery class. To know the type of work the patient was engaged in when injured is of no little importance. It should be noted on the history in the form of a permanent record.

We have been interested to note whether one eye is more often injured than the other. In 1906 Sweet¹ reported a series of 420 cases of eye injuries from foreign bodies. In these he found that

178 were injured in the right eye and 242 were injured in the left eye—54 more in the left in a series of 420. He explains the prevalence of injuries to the left eye as being due to the right hand position, which the majority of men assume while working. In our series the two eyes share more equally, only 23 more being injured in the left than in the right, in a series of 1051 cases. We would conclude that the two eyes share about equally.

The small number of major injuries, only 7.9%, would seem to indicate that much has been accomplished by the "Safety First" campaigns and by the efficiency engineer. We believe that many of what originally are simple minor injuries, thru one cause or another, become or are converted into a more serious condition. It is this feature with which we are particularly concerned in this paper. It is here that the general medical profession can be of great assistance. The *delay in proper treatment is one of the most potent factors responsible for permanent injury to the eye*. It is here that we should seek closer cooperation between the physician, who sees the case in general practice, and the oculist.

In trying to make some estimate of the time which intervenes between the occurrence of injury and treatment, we find in this series that only 17.5% were seen at our office on the day that they were injured, 43.5% on the second day, 17.5% on the third day, and 21.5% waited four days or longer before they applied at our office for treatment. We consider these figures very significant. When we know that routine culture shows that pathogenic organisms can be grown from a large number of the apparently normal conjunctivas, the importance of prompt attention to the injured eye becomes apparent.

The outer layers of the eye, and especially of the cornea, act as nature's barrier to infection, just as an intact skin surface does not permit organisms to pass and infect the deeper tissues. When the outer layers of the cornea are destroyed, either by the instrument used to remove the foreign body or by the foreign body itself, nature's means

of preventing infection has been greatly handicapped. A most unpleasant chain of events may follow; the case may go on to ulceration and abscess of the cornea, or hypopion and perforation, then infection of the vitreous and panophthalmitis, a condition requiring that the eye be enucleated, while in the case limited to abscess of the cornea, healing may leave a dense scar which will permanently impair the sight.

earliest possible moment, and in all cases where the iris has prolapsed between the cut surfaces of the wound. If this condition is neglected and the wound is left gaping, infection may extend to the interior of the eye. If this catastrophe is escaped the iris will become firmly healed into the corneal scar. This point of anchorage will be a constant source of irritation to the injured eye, often resulting in iridocyclitis and secondary glaucoma, and may even cause a sympathetic involvement of the uninjured eye. Also, the pull exerted by the adhesion will distort the contour of the cornea and cause the vision to be greatly reduced. If the lens has not been injured, and the case is seen early, a very satisfactory result may follow an iridectomy. In this series 23 cases required an iridectomy, 6, or 23.8%, having a normal vision after the operation. Without an operation the vision in most of these would certainly have been very poor, and many of the eyes would possibly have had to be enucleated.

The second group of cases in which we are most likely to make a mistake is where we fail to recognize that a foreign body is retained within the eye. It is in this group of cases that the



Fig. 1.—Extensive scarring of the right cornea resulting in permanent impairment of the sight. The result of infection following a minor injury; a foreign body embedded in outer layers of cornea. Was not seen until four days following injury, when he showed extensive abscess.

Thus we see that a simple minor injury of a foreign body embedded in the cornea, that is not promptly and properly treated, may cause permanent impairment or even complete loss of an eye.

The time element is even more important in the case of the major injuries. In this group we find two types of cases which are most often pitfalls for the medical profession. First, the cases with a perforating wound and a prolapse of the iris. As a rule, the perforation will be thru the cornea and the iris is found sticking out between the margins of the wound; it is here that a simple operative procedure, one not requiring even a general anesthetic, when promptly done, will often save an eye. The operation we speak of is an iridectomy. It should be done at the

X-ray is our most valuable aid, not only in making the proper diagnosis but also in determining what shall be our plan of procedure. First, we must impress upon ourselves the extreme importance of the removal of all foreign bodies retained within the eye, at the earliest possible moment. This means that the diagnosis must be made not at the second, third or fourth visit the man makes at the office, but the diagnosis

eled if one would diagnose the case early. The importance of the history is emphasized by the fact that twenty of our X-rays were positive for metal inside the eye, and all of these occurred in the steel group. We should go on the assumption that all cases with a history of injury while working with metal have a foreign body retained inside the eye, and then set about to prove or to disprove it at the first visit.



Fig. 2.—X-ray taken in the early part of 1897 of a long sliver of steel in the right eye, which was successfully removed by a magnet. Shown here for historic interest.

must be made on the first visit, and if the steel is within the eye it must be removed as soon as possible, the one exception being where the foreign body is completely embedded in the lens.

DIAGNOSIS.

One may ask: How can we most often make the diagnosis on the first visit? And the answer is: By taking a history, such as we have outlined at the beginning of this paper, together with a careful ophthalmic examination, supplemented by the X-ray. This is the exacting path that must be trav-

One must have an X-ray in all doubtful cases. To emphasize this point strongly, we cite three cases in this series, with normal vision and in which the one positive finding was a complaint of severe pain. It was this, and the nature of the work engaged in when injured, both of which were elicited in the history, that prompted us to have an X-ray.

It was soon after Prof. Roentgen published his classical papers that Dr. Campbell first had an opportunity to make use of the X-ray as a method of ocular diagnosis. A man who had re-

cently been injured with a piece of steel was seen at the office in the early part of the year 1897. His eye was deeply inflamed and the vision reduced. Was there a piece of steel inside of that eye and, if so, in what part of the eye was it located?

At that time Detroit, if not the entire state of Michigan, could boast of but one X-ray machine in its vicinity. It was owned, not by a medical man, but by a Mr. S. M. Keenan, who had his apparatus set up at Eloise, Michigan. It was there that our first X-ray of a metallic foreign body retained inside of the eye was taken. At that time Sweet² had not perfected his method of localization, the accuracy of which, now, in the hands of one who is skilled in that work, is almost uncanny. But by this new procedure it was possible to state positively that the man had a piece of steel inside of his eye and, in a degree, determine its location. A scleral puncture was made and the steel removed by the use of the early type of Hirschberg hand magnet. This is one of the earliest, if not the first case, in which a metallic foreign body was located within the eye by the X-ray, and successfully removed by the use of the magnet—a few months over a year from the date that Roentgen first announced his discovery of the X-ray. There was a case reported by Dr. Chas. R. Williams,³ in Boston, which precedes this case by a few months. They identified the foreign body by the X-ray; but unfortunately it was not magnetizable and so could not be removed by the use of the magnet.

Since this early date we have had excellent service from the X-ray. If we consider our series from the point of the X-ray, we see that, out of 1,051 cases, 117 or about 11.1 per cent required an X-ray before a positive diagnosis could be made. In no case have we failed to diagnose steel inside of the eye. Of the 117 cases X-rayed, 17 per cent were positive for steel inside of the eye, and all of these were diagnosed on the date of their first visit in the office.

It is a point of some practical importance to emphasize that all the positive X-rays occurred in the steel group; also of the 438 cases injured while working on the emery wheel, only two required an X-ray and both of those were negative. With this in mind, we can more intelligently advise concerning the need for an X-ray.

REMOVAL OF FOREIGN BODY INSIDE THE EYE.

Once having diagnosed and localized a foreign body inside the eye, how shall we proceed to remove it? As we read the literature, we find a great difference of opinion on this question. The great majority of such foreign bodies are metals, which are attracted by the magnet. Such being the case, all are agreed that the most expedient means of attack is by use of the magnet.

Shall we use a large or a small magnet? Remove the foreign body thru the anterior chamber, known as the anterior route, or by a scleral puncture, known as the posterior route? These are questions on which oculists are divided, and are questions which will be of little profit to discuss here. Rather, we will point out a few of the more interesting and important features as they have occurred in the magnet work for this series.

We have had but one case where we were not able to remove the steel by the magnet. This was a case where a very small piece of steel was embedded in the ciliary body. Two attempts were made to remove this, first thru a scleral puncture just back of the ciliary body, and second thru a keratome incision in the cornea, both of which failed. After a stay of ten days in the hospital the man had a normal vision, the congestion in the eye had cleared up, and there was no pain. There were two things one might do in this case. First, one could cut down thru the ciliary body and possibly get the steel. The other plan would be to allow the steel to remain in the muscular coat of the eye and observe it for irritation or siderosis. We chose the latter, and when the case was last seen, 10

months after the injury, he was having no trouble with the eye.

We have had in this series four cases of steel embedded in the lens. If the steel is completely embedded in the substance of the lens, we have preferred to wait until the cataract is mature and then, by extracting the cataract, remove the steel at one and the same operation. In this series we had one such case with a vision corrected by glasses

to 6/5 following the operation, or 2/10 better than normal vision. If one end of the foreign body is sticking in the lens, leaving a portion of the metal in contact with the aqueous, we then proceed to remove the foreign body at once thru a keratome incision in the cornea. In this group there are three cases of steel in the lens which were removed in the above manner. Two developed traumatic cataracts, while

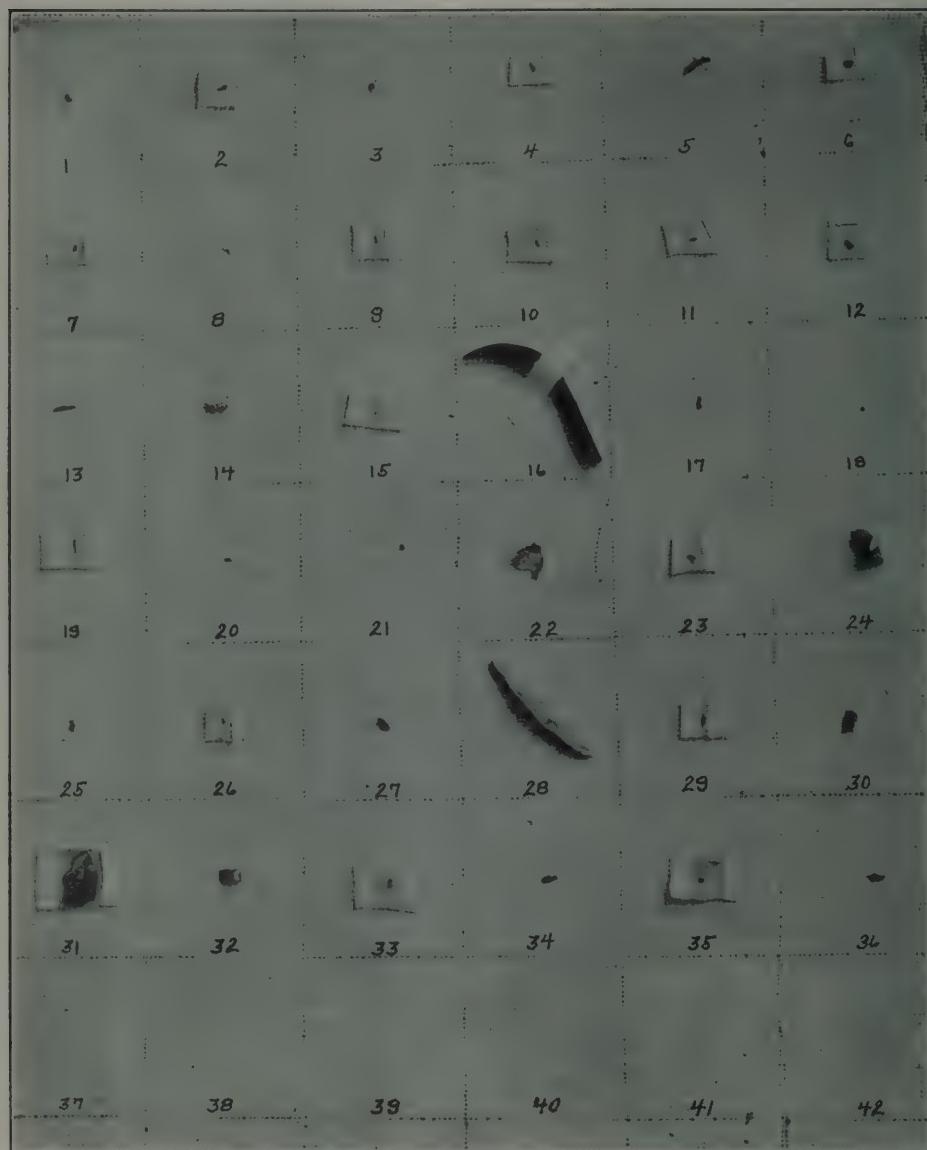


Fig. 3.—Specimens of steel removed from inside the eye by giant magnet, two-thirds actual size.

in one case the lens remained clear up to 4 or 5 months following the injury, at the time last seen in the office.

A foreign body located in the anterior or posterior aqueous chambers, we believe, should, in practically all cases, be removed thru the cornea. In cases where the foreign body has passed thru the cornea and the lens with a resulting traumatic cataract, and it is shown by the X-ray to be located in the vitreous or in the coats of the eye, it may be removed by the anterior route, if the foreign body is not so large as to unduly endanger an entanglement of the iris or ciliary body. In most of our cases localized in the vitreous, we have removed the foreign body thru the sclera. Certainly, if the anterior segment of the eye is intact and the lens is not injured, we would remove the foreign body thru the sclera, and not drag it forward as Haab⁴ advises.

We wish to report on 24 cases of steel inside of the eye, four of which did not occur in this series. Eleven of the 24 or about 50 per cent had a vision of 6/7 to .5, or practically normal, following the operation for removal of the steel. Six of these were operated by the posterior route, four by the anterior route, and in one the steel was removed with the lens at the time of the cataract operation. Eight of these cases have been seen within the last few months at the office, ranging from ten to eighteen months since their operation, and the vision given is on the basis of this last examination. Nine of the 24 following the removal of the steel had the injured eye enucleated, either because of infection or irritation. Two others were advised to have this operation, but refused it, and one because of the extensive scarring on the cornea had a vision of less than 1/10 normal. This compares very favorably with the reports we find in the literature.

The after-treatment of the case is of no little importance, and is more difficult to carry out than in most surgical cases. A working man who feels well will find it difficult to understand why he should be in bed and on his back for

ten days to two weeks, following the removal of the smallest piece of steel from his eye. But experience has taught us that such precaution is well taken. We believe detachment of the retina is reduced to a minimum by such a procedure.

For the sake of completeness, it cannot be a mistake to say a few words concerning the treatment of the minor injuries. Here three points are worthy of special mention: 1. Relative to the removal of foreign bodies embedded in the outer coats of the eye. By far the greatest number of these will be found on the cornea. 2. In removing any foreign body from the eye, only sterile instruments should be used. 3. The foreign body should be completely removed. Any stain or pigment left at the margins of the wound will keep up the irritation and cause the patient a great deal of discomfort. In our eagerness to remove all the foreign substance, we should disturb the layers of the cornea as little as possible, and all cases should be followed up and observed for infection.

To summarize the points of interest and practical importance:

1. In this series we have two great classes of work responsible for most of our cases, namely, emery grinding and steel or metal work, the two totaling 81.3 per cent of all the injuries.

2. That by far the greatest number of our major injuries occur in the second group, i. e., those working on metals.

3. Taking the series as a whole, about one case in every thirteen, or 7.9 per cent, were major injuries, while in the cases occurring in the steel group one out of every eight cases, or 12.9 per cent, were major injuries, the percentage being much higher in the steel group.

4. That better than one in ten of all our cases have required an X-ray, before we could be positive that a foreign body was not inside the eye.

5. 117 X-rays were taken, and 100 of these occurred in the steel group.

6. 20, or 17 per cent of the radiograms taken were positive for foreign

body inside of the eye, and all these occurred in the steel group.

7. The danger signal is that 71 per cent of our major injuries occurred in the steel group, all our positive X-rays occurred here, and 60 per cent of the eyes lost, or blind, were chargeable to metals. Such figures should cause us to adopt the attitude that all cases injured while working on metals are serious, and to treat them as such.

8. The magnet operation, as such, can be considered quite successful; we were able to remove the magnetizable foreign body in 95 per cent of the cases.

9. 23.8 per cent of the cases on which we did an iridectomy had a normal vision following the operation.

10. 68.5 per cent of the eyes in which the sight was lost had to be enucleated.

11. Only 17.5 per cent of the cases were seen at our office on the day they were injured, 43.5 per cent on the second day after their injury, 17.5 per cent on the third day, while better than 1/5

of the cases, or 21.5 per cent waited four days or longer, before they applied at the office for treatment. These last figures, we believe, are very important. Delay in the making of a correct diagnosis, and delay in the instituting of proper treatment are two of the most potent factors responsible for permanent injury to the eye, and are responsible for not a few of the artificial eyes that we see.

If the results here reported are to be classed as a meritorious showing, certainly the credit is to be shared with those surgeons and general practitioners who early in their cases, have realized the necessity for special examination or treatment. If the number of eyes enucleated or permanently impaired are to be materially lessened, then we must strive to obtain a higher grade of ophthalmic judgment, not only in the oculist but also in the general medical profession. The delay in correct diagnosis and proper treatment must approach a minimum.

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SELF INFILCTED EYE INJURIES.

MARC LANDOLT, M.D.

PARIS.

The writer confirms some of the recent observations regarding self-inflicted injuries of the eye and records a case in which, on two occasions, a penetrating wound of the cornea was made with the intention of producing traumatic cataract.

Every oculist who served during the last war had occasion to observe cases of conjunctivitis induced in the manner described by Dr. Danis in his concise and interesting article in the August, 1920, number of this Journal. I take up this subject simply to corroborate the fact that it was particularly among the soldiers of the Colonial Infantry that this practice was most common; it was from them that the other troops learned their lesson. I regret that their pupils were found to extend into the neighboring army.

The first cases of this kind that I treated, before I was aware of this condition of induced conjunctivitis, showed for the most part traces of an old trachoma, so that I believed I had to deal with a bona fide affection of the eyes. The list of remedies administered in the two remarkable cases reported by Dr. Friedenwald (A. J. O. v.3. 858) have most vividly recalled to me all the worry I caused to these, after all pitiable fellows. Later on, with quite different treatment, the result was much better and much more prompt. "This peculiar form of conjunctivitis," I used to remark quietly, "bears a direct relation to digestive disorders. This man must be kept in bed, on absolute diet." Very rarely did the disease last more than 4 or 5 days.

I remember having found a sign, of more than probable significance, for conjunctivitis provoked by the application of soap, in the formation of a white precipitate (oleo-margarate of zinc probably) when a drop of our collyrium of sulfate of zinc, two and a half per cent, was instilled into the eye. This precipitate, for example, does not form in the case of irritation due to the application of cigarette ash.

This last form was very rare, compared with conjunctivitis due to ipecac.

As for the conjunctivitis induced by the castor bean, the appearance is so characteristic, that there is no question of doubt, unless the process is quite improved. For the moment the individual is content to introduce into the lower cul de sac a smaller or larger fragment of a bean, stripped of its shell, there follows a white eschar, sharply defined, covered by a thick false membrane, consisting of two parts which exactly correspond to each other, on the bulbar and on the palpebral conjunctivae. No ocular affection can be confounded with this conjunctivitis.

Besides the conjunctivitis I wish to state that many years ago I saw, among a group of Russian emigrants, who were passing thru France on their way to the United States, a man who exhibited at the center of his right cornea, a speck in the form of a regular quadrangle with sides measuring 3 to 4 mm. and of a very white color. It was an erosion, artificially produced, and rendered opaque by the application of acetate of lead. This eye had been mutilated in order to escape military service. I am sure our American colleagues have seen many analogous cases.

The following is, however, the most curious case I have ever observed, and is now published for the first time. At the beginning of September, 1912, I was consulted by a young man of fine appearance, presenting in the right eye a perforating wound of the globe, about a half centimeter in length, straight and vertical, exactly across the limbus, in the middle and below. A droplet of the vitreous was oozing from the wound. There was a moderate hyphema. The pupil was transparent. The patient was extremely anxious to know if this wound would produce a traumatic cataract.

Questioned as to the origin of the injury the young man explained that on

the day before, at Lausanne, as he was coming down a stairway with an open knife in his hand, he stumbled and injured his eye. In order to be treated here, he had taken the first train out, spending the night in traveling; no dressing whatever having been applied to the eye. I was greatly astonished, but I had no reason, at that moment, to doubt the veracity of his story.

That same day I sutured the globe. The recovery was uneventful. The sutures were removed in five days.

About the middle of October my patient asked me for a certificate stating the condition of his eye. He had several flakes in the vitreous, the pupil was slightly irregular; the vision was 0.2.

The patient never returned to get his certificate, which I have just found among my papers. I decided afterwards that he had simply wished to know what his acuity of vision was, and if a traumatic cataract had developed.

Six months later I was called to the house of the same patient. My astonishment was extreme when I found in the same eye, exactly in the same place, a perforating wound almost identical with the first. This time, without any deception, he confessed at once that this injury as well as the first, was self-inflicted. Before a mirror, in perfect tranquility, this fellow had, with a penknife, actually perforated his own eye, in the ciliary region. And he had done this twice!

A suture was not necessary this time. The wound healed without further trouble.

Such a self mutilation, certainly unexpected in a young man who not only stood high socially, but also occupied a prominent place in the public eye (sharper delineation is not permissible), is explained, without being excused, by certain features of the French military law in force at that time.

All men were required to do three years' military service. However certain classes of students needed only to serve one year, on condition that they would have attained, before their 27th year, certain degrees, such as Doctor of Laws, Doctor of Medicine, etc. If at this age they had not fulfilled this condition they were recalled to serve the other two years.

My patient seeing the approach of this limit, and being far behind in his studies, had had recourse to this desperate means to attempt to disqualify himself for military service. He had wished to cause a cataract in his right eye. We have seen that in spite of his perseverance he was unsuccessful.

In this case, if I understood correctly, besides the ennui of having to do two years of supplementary military service, there were also certain nuptial projects which would have to have been postponed or broken off entirely in such an event.

I do not know what has become of this man. I do not know what he did from 1914 to 1918.

I am very much indebted to Dr. Reder, of The American Hospital of Paris, for his kind translation of this paper.

HEREDITARY OPTIC ATROPHY.

J. MILTON GRISCOM, M.D.

PHILADELPHIA, PA.

The author was able to observe nine cases of this disease affecting two generations of a family. He also reviews some of the more recent literature regarding it and inclines to the view that a low grade toxic retinitis may be the essential lesion. Read before the American Ophthalmological Society, June, 1920.

In a communication before this Society in 1918, Zentmayer thought that the data regarding the etiology of hereditary optic atrophy were insufficient from which to draw conclusions. With the idea that the description of a previously unrecorded family pedigree chart, physical and X-ray findings,

usual procedure in Leber's disease. In the second generation of 9 members, 7 have poor vision—3 females and 4 males. In the third generation of 22 members, 6 have visual difficulty—3 males and 3 females. In one instance an affected father has an affected daughter—the only offspring. In 2

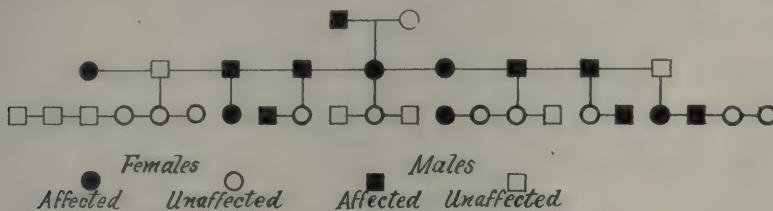


Fig. 1.—Diagram of pedigree of family affected with hereditary optic atrophy.

might serve as an additional piece of evidence, from the accumulation of which more definite conclusions may finally be drawn, the following report was considered worth presenting.

The papers of Beers, Leber, Nettleship, and Wilbrand and Saenger have made the clinical characteristics of this disease so well known that no attempt will be made in this communication to further describe them.

The accompanying pedigree chart demonstrates graphically the affected and unaffected members in the family which is the basis of this report. In three generations of 33 individuals there are 8 males and 6 females affected, 8 males and 11 females unaffected, by the disease. In the first generation the father had poor vision, and, altho there is no record of an examination, it is safe to assume that the difficulty lay in the optic nerve and retina. The mother is still living and has good vision, so that the affection was transmitted to the second generation thru an unaffected female, which is the us-

cases affected fathers have each 2 children—an affected son and an unaffected daughter. In one case, an affected mother has 3 children with good eyes; in another, an unaffected father has 4 children—2 affected and 2 unaffected. In the matter of transmission, therefore, no regular rule exists in this family, males and females being affected about equally.

The writer has had the opportunity to examine 6 of the 7 affected members of the second generation, and 3 of the 6 affected children in the third generation. The patients were well nourished, intelligent individuals without any evident inherited deficiencies except poor vision, which in each case began in early childhood. There was no consanguinity. Externally their eyes were normal in all respects, with full ocular movements and prompt pupillary response to light and accommodation. However, there was a variation in the fundus and visual field findings in certain respects as detailed below.

Mrs. L., aged forty-six. V.R.E.=10/20. V.L.E.=10/200. Corrected vision, O.D.—1.00 cyl. ax. 180°=18/200; O.S.—3.00 cyl. ax. 180°=20/200. In each eye there were a few floating vitreous opacities, the discs were oval, axis 90°,

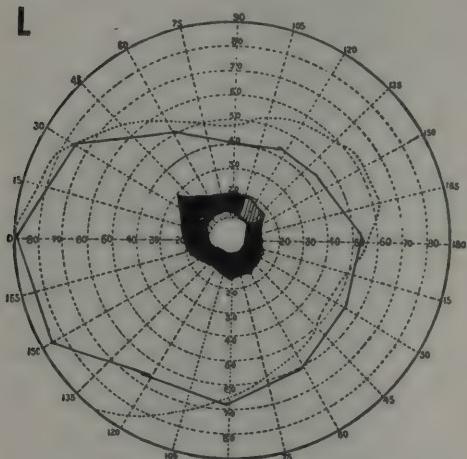


Fig. 2

Figs. 2 and 3.—Field of vision of Mrs. L. No color vision central or peripheral.

very pale, margins well defined, lamina cribrosa not visible. Both arteries and veins very small; no macular or peripheral lesions. The visual fields showed full form, but no central or peripheral color fields. In the right eye there was a paracentral absolute scotoma involv-

ing the blind spot and located down and out about 10° to 30° from the point of fixation. In the left eye there was a nearly complete annular scotoma and a small relative scotoma.

C. M., male, aged thirty-six. V.R.E.

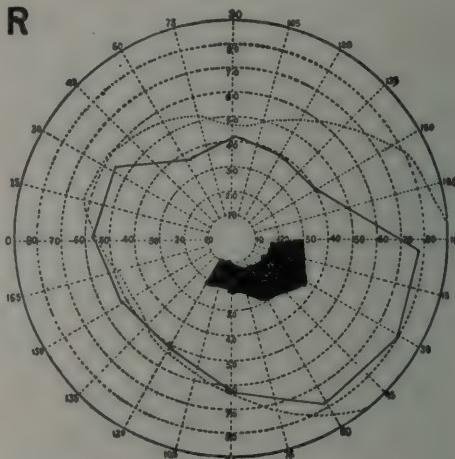


Fig. 3

=20/200; V.L.E.=20/70; not improved by glasses. Both eyes: Media clear, discs oval, axis 90°, well defined, pearly white, central cupping and visible lamina cribrosa; vessels were normal in size and contour; macula and periphery normal. The right field was

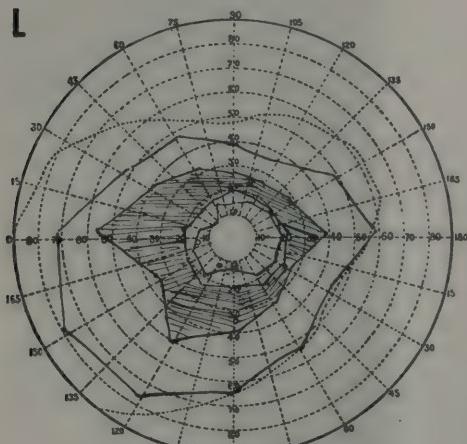


Fig. 4

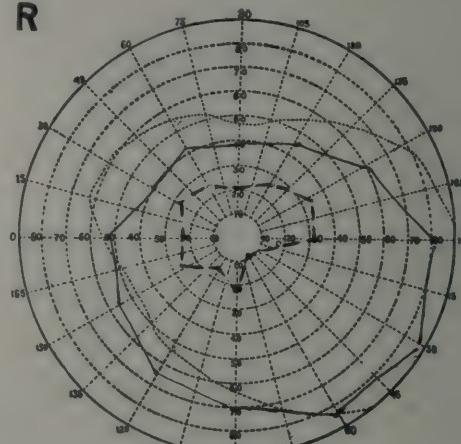


Fig. 5

Figs. 4 and 5.—Fields of C. M. No field for green. R. field for red shown by inner broken line.

full for form, the red field somewhat irregular and contracted to within 30° , with no central or peripheral green vision. In the left eye the form field was full, the red field much contracted, no green vision, central or peripheral,

white, margins well defined, lamina cribrosa visible, and a complete narrow ring of choroidal atrophy surrounding the disc. The vessels were thread like in size; maculae showed a fine pigment disturbance, and in the periphery

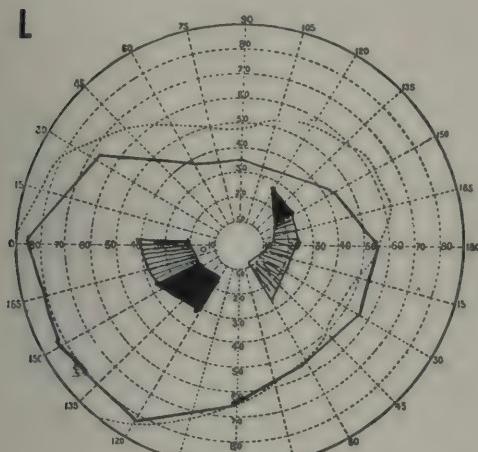


Fig. 6

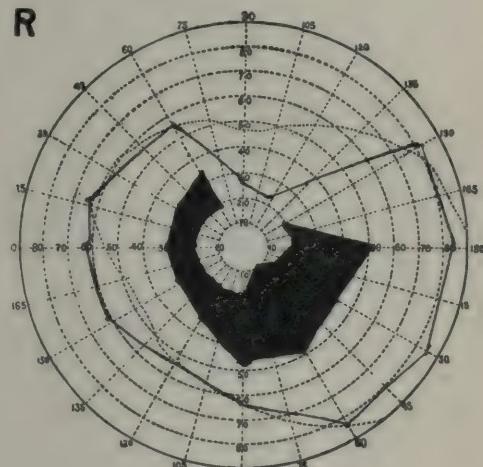


Fig. 7

Figs. 6 and 7.—Fields of Mrs. P. who had central vision for blue, but had no red or green vision.

and between the form and red fields there was a relative annular scotoma.

Mrs. P., aged thirty-four. V.R.E. = 18/200. V.L.E. = 18/200. Corrected vision, O.D. — 1.00 sph. = 20/200; O.S. — 1.00 cyl. ax. 90° = 20/100 part. In both eyes there were many fine vitreous opacities, discs oval, axis 90° , pearly

there were a few spicule like pigment areas overlying the retinal vessels. In the right eye the field for form was practically normal; there was no central or peripheral vision for blue, red, or green, and lying within 20° of the point of fixation was a sector like absolute scotoma. In the left eye the

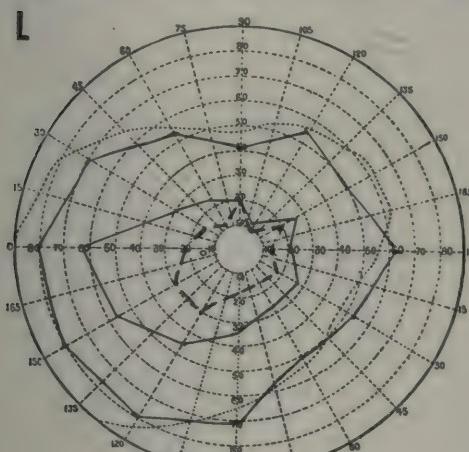


Fig. 8

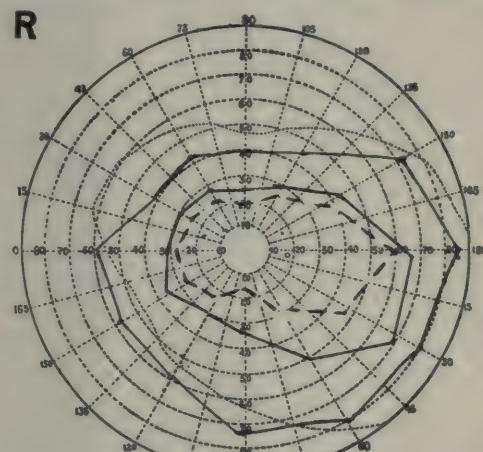


Fig. 9

Figs. 8 and 9.—Fields of C.M. Inner continuous line blue fields boundary; broken line boundary of red fields. No perception of green in either eye.

form field was full; there was no central or peripheral field for blue, red or green, and located on both temporal and nasal sides of fixation were two relative and two small absolute scotomata.

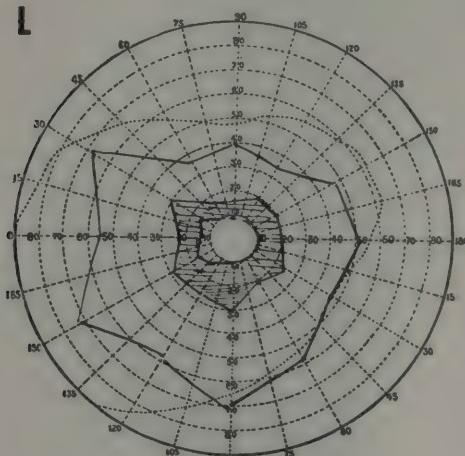


Fig. 10

Figs. 10 and 11.—Visual fields of R.M. No color vision.

C. M., male, aged thirty-two. V.R.E. = 20/100; V.L.E. = 5/200. Corrected vision, O.D.—0.75 sph. \odot — 0.75 cyl. ax. 90° = 20/50; O.S. — 1.50 sph. \odot — 0.75 cyl. ax. 90° = 20/200. In each eye media clear; disc well defined, physiologic cupping, lamina cribrosa visible, pearly white on the temporal and somewhat

pale on the nasal side; vessels about one-half normal size, fine granular pigmentation thruout the retina. The visual fields were practically full for form, blue and red. No central or peripheral vision for green.

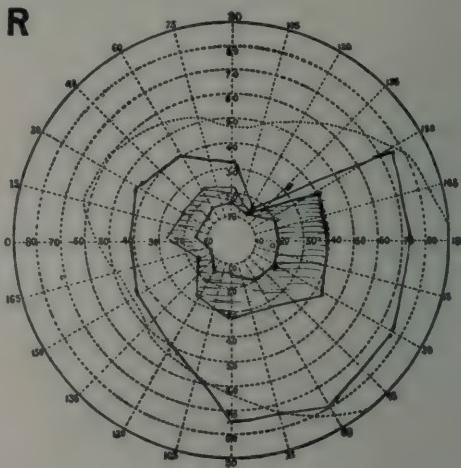


Fig. 11

R. M., male, aged thirty. V.R.E. = 10/200; V.L.E. = 10/200; not improved by glasses. Both eyes: media clear, discs round, pearly white, margins well defined, lamina cribrosa visible. Vessels almost thread like in size and can be seen only about one disc diameter from the disc margin. Retinae

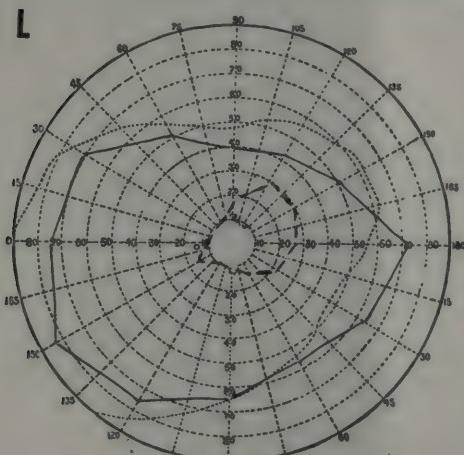


Fig. 12

Figs. 12 and 13.—Visual fields of Mrs. G. Broken line boundary of field for red. No central or peripheral

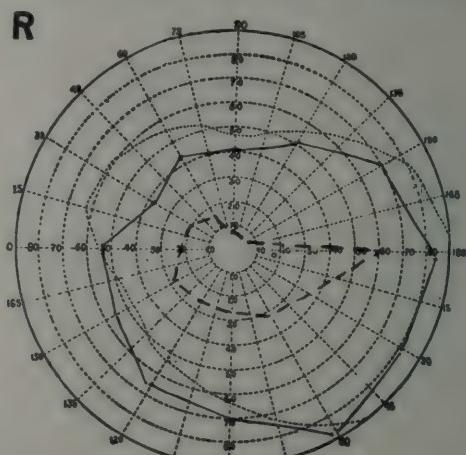


Fig. 13

finely granular thruout, and a few pinpoint, glistening spots and fine pigment deposits seen in the macular region. The fields for form were slightly contracted in one or two segments. The red field was contracted to within 20° in the right eye and 10° in the left eye. No central or peripheral vision for green. Just outside the red field there was an annular relative scotoma occupying a zone about 20° wide.

Mrs. G., aged twenty-seven. V.R.E. = 20/100; not improved by glasses. In each eye the media were clear, disc round, well defined, very pale, physiologic cupping, lamina cribrosa visible. The vessels were slightly smaller than normal, macula and periphery normal. The visual fields were full for form, the red field irregular and somewhat contracted, no central or peripheral vision for green.

I. M., female, aged eight. V.R.E. = 20/200; V.L.E.= 20/200; not improved by glasses. In each eye the media were clear, disc oval, axis 90°, well defined, very pale, especially on the temporal side, central cupping, lamina cribrosa visible, vessels normal, macula and periphery normal. Visual fields could not be satisfactorily taken.

A. M., male, aged six. V.R.E.= 20/70 part; V.L.E.=20/70 part; not improved by glasses. In each eye the media were clear, discs oval, axis 90°, well-defined margins, physiologic cupping, lamina cribrosa visible, vessels normal, macula and periphery normal. Fields could not be taken.

R. M., male, aged six. V.R.E.= 20/50; V.L.E.=20/50 part; not improved by glasses. In each eye the media were clear, disc oval, axis 90°, slight pallor on temporal side, margins well defined, physiologic cupping, vessels normal, retina slightly granular. Fields could not be taken.

Consideration of the above fundus and field examinations, together with the family history of inheritance, led the writer to class these cases as hereditary optic atrophy, in most particulars of the type described by Leber. A thoro general examination of these cases revealed negative heart, lung, urinary and blood Wassermann

findings. In only one case was there any suggestion of nerve instability, that of R. M., in which there were some evidences of tabes dorsalis. In each instance X-ray examination showed an entirely normal sella turcica and sphenoid, with the exception of R. M., whose pituitary fossa was enlarged slightly beyond the normal limit.

Any effort to ascertain the factors underlying this disease must deal largely in the field of speculation, since there is no record of any pathologic examination having been made of an eye affected with hereditary optic atrophy. The X-ray, eye-ground and visual field studies, therefore, offer the only means of arriving at a conclusion as to the primary cause. Only a relatively small number of cases of hereditary optic atrophy have been examined by the X-ray. Fisher, Pollock, and Zentmayer reported cases with some enlargement of the sella turcica. Bruner found evidence of sphenoid cell overgrowth with thin walls. The visual fields have been recorded by a number of observers, with quite constant results, the leading feature, as stated by Nettleship, being a central or paracentral scotoma with preservation of the form fields. An interesting suggestion that the pituitary gland might be responsible for the optic atrophy was made by Fisher as the result of his X-ray findings. There was no record, however, in the report that his patients showed any evidence of hyperpituitarism, and the fields gave no evidence that any portion of the optic tracts had been encroached upon by an enlarged pituitary body. It is difficult to explain the constant preservation of the form fields, which is a usual finding in this disease, if the optic nerve has been temporarily blocked in any part thru pressure from an enlarged pituitary or from sphenoid cells. In the absence of any other general or local activity of the gland, one cannot be greatly impressed with its importance as the causative factor in hereditary optic atrophy.

In the cases reported above, aside from the white nerve atrophy, the most

constant fundus picture was the evidence of a low-grade retinal degeneration, as shown by the slight pigment disturbance and the atrophic vessels. The fields conformed to those previously reported with respect to the preservation of form, but the scotomas were all paracentral or annular, instead of the usual central scotoma. In some of the cases there was entire loss of color vision, while in others vision for blue, red, and green was limited in varying degrees.

The analogy between Leber's disease in its early stages and certain toxic amblyopias has been pointed out by Cargill. He suggests that the disease should be termed hereditary central retinitis if it were proved that the primary changes were in the retina. The degeneration and atrophy under

these conditions would be ascending and not descending. Researches in neurology and certain toxic amblyopias by Birch-Hirschfeld led him to the conclusion that many cases of so-called retrobulbar neuritis had the primary lesion in the retina. A study of the eye-grounds in conjunction with the visual fields leads to the conclusion that the family herein described had suffered from a low-grade early toxemia which attacked the optic nerve and retina in particular, with consequent nutritional disturbances. There was nothing in either history or examination which indicated the source of toxic production, but it would seem likely that some type of perverted secretion, acting on inherently unstable nerve elements, was the underlying cause of the type of atrophy, as seen in the above recorded family.

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TRAUMATIC RUPTURE OF THE INTERNAL CAROTID INTO THE CAVERNOUS SINUS.

ISAAC HARTSHORNE, M.D., F.A.C.S.

NEW YORK CITY.

The case here presented was peculiar in the absence of subjective noises. It seemed to be cured by ligation of the internal carotid, but some effects of the lesions still remained when the case was shown to the Eye Section of the New York Academy of Medicine, November 15, 1920.

Sunday afternoon, August 8, 1920, while running away from some cows near a camp in Carmel, N. Y., F. R., age 12, schoolgirl, fell down a bank and hit her head against a stone wall. She regained consciousness in five to ten minutes. Fearing fracture of the skull and internal injuries, she was taken at once to the Danbury Hospital, Danbury, Conn. She had no bleeding from



Fig. 1.—Traumatic exophthalmos from rupture of internal carotid into the cavernous sinus. Side view.

the nose, throat or ears; no vomiting, and no prolonged unconsciousness.

Within twenty-four hours she presented marked exophthalmos of the left eye and complete ptosis of the left eyelid; also extensive swelling and subcutaneous hemorrhage under the eye, as in a black eye, and over the left side of the face, especially in the region of the parotid gland and extending below the angle of the jaw. Except a few bruises there was no other injury, and no paralysis outside of the orbit. She complained of abdominal pain, which disappeared in a few days. While there was no further unconsciousness, she was mentally dull for a few days from the concussion. Treatment, rest in bed.

Thru the courtesy of Dr. E. A. Stratton, of Danbury, she was first seen by me on August 18. She appeared normally bright. The left eye was exophthalmic about 5 mm., with complete ptosis of the lid. Swelling of the face still persisted, as stated above. There was no redness or swelling of the upper eyelid except from the bruise, and no chemosis or dilatation of conjunctival veins or redness of the conjunctiva. The eyeball was absolutely fixed centrally, in complete ophthalmoplegia; pupil fully dilated and inactive. No inflammation of the iris. Media and fundus negative, except unusually tortuous and engorged veins. Disc outlines clear and color good. Tension with fingers was not increased; and no pulsation could be felt or seen, either of the globe or in the retinal vessels. She could easily count fingers at 12 to 15 feet. The right eye was apparently normal in every respect except that the disc was distinctly hyperemic, tho not swollen. Pulsation was visibly transmitted to the left internal jugular vein in the neck.

The first diagnosis was fracture of the base with extensive hemorrhage into the orbit. For further efforts at diagnosis and treatment she was, at my suggestion, brought to St. Luke's Hospital, New York City, on August 25th.

She presented the same picture as above stated. Vision = 15/50, and fields were good. X-ray examination was negative. The House Surgeon, Dr. B. T. Larson, then did what I should have done at the first, and with the stethoscope obtained a loud bruit thru the left eyeball and over the left temple, synchronous with the pulse and stopped by compression of the internal carotid artery in the neck. Cor-

rect diagnosis, made by Dr. Larson: "Traumatic Rupture of the Internal Carotid Artery into the Cavernous Sinus, producing an arteriovenous aneurysm."

September 2, 1920, Dr. Wesley C. Bowers tied off the internal carotid artery in the neck on the left side with a double silk tie. No untoward symptoms followed the operation and the wound healed rapidly.

The improvement was gradual, beginning with the internal rectus. I



Fig. 2.

Traumatic rupture of internal carotid into cavernous sinus front view. Fig. 2. Before operation.
Fig. 3. After recovery.

saw her again about one week after the operation, and at that time the exophthalmos was reduced to about 2 mm. and the lower edge of the upper eyelid rested midway across the pupil. The left fundus appeared the same as before operation, except that the disc was very anemic. The right disc was still hyperemic. No bruit could be heard over the left eye, temple, or forehead, and the venous pulsation in the neck had ceased. She was discharged from the ward September 13, 1920, with ability to rotate the eye up and down, and inward, but not outward. The pupil was dilated and fixed, and she had no ability to accommodate for near objects. She did not at any time complain of, nor on direct question admit of hearing any noises in the head.

October 28, 1920, Dr. Larson found vision R=15/15; L=15/40.

Corrected: R +0.25 sph.=15/15. L +1.12 sph.=15/20; no cycloplegic used.

Left eye showed no ability to accommodate. Fields of vision in both eyes normal for green, red, blue, and white.

At the present time, November 15, 1920, she presents practically no exophthalmos, no ptosis, and improving external rotation. Both discs are now nearly normal in color. It is doubtless too soon to be able to state what the end result will be.

There have been something over 300 cases of pulsating exophthalmos reported. In 1915 Dr. A. J. Bedell¹, of Al-



Fig. 3.

bany, contributed a very complete bibliography to date.

As to the diagnosis: According to de Schweinitz and Holloway² it may be impossible to differentiate between arteriovenous communication in the cavernous sinus and aneurysm of the internal carotid in the cavernous sinus, and extraorbital and intraorbital aneurysm of the ophthalmic artery. But Zentmayer³ states that the great majority of the traumatic cases are a rupture of the internal carotid artery into the cavernous sinus, producing an arteriovenous aneurysm in the cavernous sinus.

In this case there was comparatively little venous stasis, as shown by the lack of redness or swelling of lids and conjunctiva; and the absence of dilatation of the nasofrontalis and angular veins at the inner angle of the orbit. De Schweinitz and Holloway (p. 45) state that the venous masses at the in-

ner angle of the orbit do not develop until several weeks after the rupture of the artery; and as this case was operated upon, in less than four weeks after the accident, it may be that the venous masses would have appeared later if the operation had not been done so soon.

Again referring to de Schweinitz and Holloway, p. 37, it appears that the persisting paralysis of the sixth nerve may be due to its laceration where it grooves the body of the sphenoid (in cases of fracture of the base); or, in other cases, to its proximity to the internal carotid artery in the cavernous sinus.

In this case, which after admission to St. Luke's Hospital was examined by other men besides myself, no pulsation was seen in the fundus, or of the globe, and no pulsation was felt when the eyeball was pushed back into the orbit. Pulsation was transmitted to the internal jugular vein in the neck. Dr. Homer Smith has suggested that probably the pulsation of the globe was present, but that a sufficiently delicate method was not used to observe it. He stated that if a piece of thin paper were placed on the exophthalmic eye, the paper could be seen to rise and fall with the pulsation. This test was not made. De Schweinitz and Holloway, p. 19, state that 90% of these cases pulsate—i. e., 10% do not pulsate.

Dr. Alfred Wiener suggests that in those cases in which the inferior and superior petrosal sinuses—into which the cavernous sinus empties—are proportionately larger than the ophthalmic vein, the pulsation might be transmitted downward to the internal jugular vein in the neck instead of outward into the orbit to the globe.

The circular sinus passes around the pituitary body and connects the right and left cavernous sinuses. Hence the hyperemia of the right disc was doubtless due to pressure transmitted from left to right cavernous sinus via the circular sinus, without enough involvement of the right cavernous sinus to make the venous stasis and exophthalmos bilateral.

FEATURES OF SPECIAL INTEREST

1. Entire absence of subjective symptoms of noises in the head.
2. Absence of dilation of conjunctival veins and of the naso-frontalis and angular veins at the internal angle of the orbit.
3. Complete ophthalmoplegia.
4. Pulsation transmitted to the internal jugular vein of the neck in the same side instead of to the eyeball.
5. Recovery, with retention of excellent vision (to date), after ligation of the internal carotid artery on the same side.

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SUBNORMAL ACCOMMODATION; THE RESULT OF FOCAL INFECTION.

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In the three cases here reported subnormal accommodation was associated with focal infection in the tonsils. Removal of the tonsils in one case was followed by rapid recovery.

Some years ago I had at about the same time three patients with subnormal accommodation. All of these had nasty, infected tonsils, which would get inflamed on the slightest provocation. As these people were perfectly all right every other way, I felt sure that the tonsillar infection was the probable cause of the lack of normal accommodation; but as none of them would have his tonsils removed I could not determine this to my satisfaction. To the most promising one I offered to remove the tonsils without any charge, but without avail. And just at this time some physician published in The American Medical Journal an article on focal infections and their relationship to diseases of the eye; and in it was cited a case of a boy whose accommodation was practically abolished, which promptly returned to normal after the removal of diseased tonsils. I read this article to my proposed victim, but it did not interest him enough to have his tonsils removed: so I had to put the idea in the background, awaiting for a suitable occasion to demonstrate to my own satisfaction the relationship between lack of accommodation and infection from chronically diseased tonsils.

In the last two years I have had three other cases of this character, so I should judge that they are not common. Of this group I was able to persuade one to have his tonsils removed; and while he lost his tonsils he got back his accommodative power and I got the data that I had been waiting for these years.

Case I. Mrs. B., age 32. Could not read even for a short period without blurring and exhaustion. Had worn glasses for some time. Subject to sore throats, and had quinsy three or four times. Examination revealed large red tonsils, with enlarged crypts filled with plugs; foul secretion exuded on

pressure. She was refracted under drops, and with the correction the near point for both eyes was 8 inches = age 37. After three weeks the near point was 10-11 inches = age 42. We had to add plus one sphere to the static refraction to enable her to read with comfort. About one year ago examination revealed the near point at 9 inches, with this correction.

Case II. Mrs. A., age 37. Complains she cannot see to sew, and eyes blur. Wears glasses constantly. Distance correction given under drops, but had to add plus one sphere to this to enable her to sew with comfort. The near point with this addition was then 10 inches = 41 years of age, with a presbyopic correction for the average person of 45 years of age. Examination here revealed badly diseased tonsils, with pus in the crypts.

Case III. Mr. P., age 24. Complains of headaches; gets drowsy in the afternoons, and when he tries to read in the evenings he usually falls asleep—the typical history of a presbyope. Has been wearing glasses fitted by an oculist for a year; but these have not helped him at all. After the drops had worn away and with the correction the near point was 6 inches = age 31: one week later the near point was 8 to 8½ inches = age 38.

History revealed he has been subject to colds, which usually settled in his throat. The examination revealed large, chronically inflamed tonsils and a large adenoid. About three weeks after I gave him his glasses he had an attack of tonsillitis; and when this had subsided he had the tonsils and adenoids removed under local anesthesia by Dr. McNaught, who also remarked on their diseased condition. Three weeks after the removal of the tonsils the near point had advanced to 5½ to 6 inches; and two weeks later than this the p.p. was 4 to 4½ inches, the av-

erage range for a man of his age. He reported that he felt fine and was able to use his eyes with perfect comfort and with none of the distressing symptoms that he had previously experienced. In this case it is quite interesting to note that the converging power is 40 degrees plus, showing that the unusual effort expended to get accommodation had stimulated the twin function of convergence.

After the use of homatropin some eyes are slow to regain their normal tone. The use of pilocarpin at night for a week is very useful here; but if there is any complaint for a longer period than this the cause is apt to be reduction of the accommodative power of the sphincter.

Whenever one encounters a case of subnormal accommodation it is well to bear in mind, however, that there is another cause for this symptom. Neurasthenics are frequently troubled this way; but their complaint is usually quite different from the tonsillar type. They report that their eyes are tired and ache in the mornings and that it is quite an effort to use them at first, but as the day wears on they get limbered up and this discomfort passes away; and after dinner they usually feel quite fit. These are the people "who hate to get up in the morning and to go to bed at night."

On the contrary, the infectious type have a history similar to presbyopia,—the eyes begin to tire as the day proceeds; they get drowsy in the afternoon and are apt to go to sleep trying to read at night. These facts are quite interesting, for if the accommodation of the first type were examined late in the afternoon it might appear normal; while in the latter, an examination early in the day would give an incorrect idea of the accommodative power. Just as the patient who has reached the presbyopic age, it is often necessary to measure the accommodation after the eyes have been used all day, to get the right estimate of the cause of the eye discomforts.

The preceding paragraph has just been read to a student in the University. He is a neurasthenic and he stated that the description of that type

fitted his case exactly. Mr. M., age 19, has been wearing glasses for 18 months, but has frequent headaches. The near point with his old correction (which was fitted by another man) is $6\frac{1}{2}$ inches — age 33. His tonsils have been removed, but there is still a large piece remaining in the right apex; and this piece is inflamed and red. This may have some influence on his accommodation; but in addition to this he is of the neurotic type. With the new correction, determined under drops, his near point is $5\frac{1}{2}$ inches, the range of a man of 29.

Focal infections from the teeth and nasal sinuses have not in my experience caused weakness of accommodation. Infected teeth have usually caused a spasm and where excessive spasm exists, under drops, I inquire into the condition of the teeth. Chronic inflammation of the nose may cause an upset of the nervous equilibrium, and thus indirectly be responsible for such cases.

Of course any general disease sufficient to cause intoxication of the whole muscular system would naturally affect the ocular sphincters, as a part of that system; and it is more than probable that in cases of infection from tonsils observations on the behavior of the general muscular system would also show evidences of weakness.

This paper has been presented simply to emphasize the fact that there are cases of eye distress the direct result of insufficient accommodative power; and in these cases of discomfort after the eyes have been carefully refracted it would be well to investigate the accommodation and if that be impaired then look farther for the cause of it.

Civilization demands greater use for the eyes, both in business and in pleasure; and therefore a function that is so constantly used must needs be carefully guarded and preserved. And every examination of the eyes should include an investigation of the range of the accommodation.

The question of glaucoma, of which diminution in the power of accommodation is a prominent symptom, has not been considered here; the cases cited having no symptoms of that disease.

CLINICAL REMARKS UPON SOME VARIETIES OF GLAUCOMA, ESPECIALLY WITH REFERENCE TO PROGNOSIS AND TREATMENT.

G. HERBERT BURNHAM, M.D., F.R.C.S.

TORONTO, CANADA.

Various forms of primary glaucoma are here discussed and illustrated by cases.

The varieties of glaucoma to be dealt with do not include those secondary to cases of cycloiritis with copious exudation, and to wounds.

My mode of procedure will be to draw upon cases, demonstrating the different varieties, to give the treatment followed out with the rules guiding it, and then finally to give the prognosis with my reasons.

I am venturing to write what I have been observing for many years regarding this disease, glaucoma. This disease is due primarily to a pathologic condition of the ciliary processes, and certain variations of this condition are accountable for the varieties of glaucoma, and these, carefully studied, enable one intelligently to plan the treatment, and to give a fairly accurate prognosis.

To find out the reason why disease of the ciliary processes is associated with pathologic changes so different in their manifestations and effects, opens up a fertile field of research work, as we at present, in very many cases, have only ill-digested suppositions to assist us.

Some forms of acute glaucoma respond quickly and permanently to an iridectomy, with which may, or may not, be combined Priestley Smith's operation. Again, what is apparently the same condition does not do so well, and after the operation there occur relapses of pain, and congestion and perhaps plus tension. When this happens it means that there has been in addition to much congestion and swelling of the ciliary processes, which alone were present in the cases of the first variety, an actual inflammation of the ciliary processes. Now if the second variety, that of inflammation be treated, in addition to the iridectomy, with mercury and the iodid of soda, and

perhaps atropin to see if the pupil be bound down in any way, a good and permanent recovery will result.

Again in another form in which dimness of vision, as 6/9, 6/12, or less, and the optic disc not cupped, T. full, pupil a little dilated, and tho active does not contract fully, fairly good or shallow A. C., we have to deal with a slow cyclitis, unassociated with pain. In some of these cases, if eserin gr. $\frac{1}{8}$ be used, there is only a slight uneasiness of the eye, which quickly passes away. In others, apparently similar, this same strength of eserin may give rise to most severe eye-pain, and also even acute vomiting after every application.

This means that the greater the severity of these symptoms, the more extensive is the disease of the ciliary processes. So in these cases tho the T. is plus, I have found it wiser to use eserin gr. 1/16, and mercury and the iodid to begin with. I use tablets of Hyd. c. Cret. et Doveri of the strength of hyd. c. cret. gr. 1 to a tablet, 3 d.s. $\frac{1}{2}$ an hour after eating, and sodii iodidi gr. X. with sodii bromidi gr. V. 3 d.s. one hour after eating.

As soon as the eye bears eserin gr. 1/8 with very little reaction, if the T. is plus, tho the vision is improving, I advise an iridectomy. If, however, the T. is undoubtedly approaching normal and the vision is improving, I refrain from an operation.

The keratome is entered well back in the sclera, for in this way a well filtering scar is made. I get as good a result as with trephining, unassociated with its drawbacks, for the sclera is, and remains healthy.

After the operation I continue for some time the local and internal treatment. The length of time of continuance of the treatment varies from 3, 6,

9 months or longer, according to the severity of the diseased condition; for this type of affection of the ciliary processes has sometimes been of long duration before coming under the notice of the oculist.

I may also add that in people of 60 years or older, sometimes vision cannot be made to exceed 6/9 and a few letters of 6/6, tho no apparent reason can be found, as media are clear and tension normal. These are sometimes incipient cases of glaucoma, as evidenced by subsequent glaucoma, perhaps several years afterwards. Eserin is used with benefit, taking away an uneasy feeling often complained of and improving vision.

However, if an operation has been advised to be done at once and not agreed to, then if subsequently performed, it may be better in some cases to make an Elliot's trephining, so as to be sure of a filtering scar. If, however, an iridectomy be done, I should advise, first making a conjunctival flap, and then the scar is more likely to be a well filtering one. In fact I think that all iridectomies for glaucoma should be executed in this way, as being more in keeping with our beliefs.

The prognosis in all the varieties of this form of glaucoma is good, even in those in which the use of eserin causes such violent reaction.

Now in cases in which there are decided cupping of the optic disc, T. plus, good a.c., p. a little dilated and feebly active; in fact in this form the iris seems sometimes to hang as an almost lifeless curtain, even atrophic looking; thus showing the long standing diseased condition of the ciliary processes, we have to deal with the most serious form of glaucoma.

Eserin may be fully used and no disturbance of the eye, sometimes with an improvement of vision, but still T. plus. In this form an iridectomy does not keep the tension normal, i. e. T. plus soon returns save in exceptional cases. Therefore I have preferred Elliot's trephining operation, using Beardsley's sclerectomy.¹

The filtering scar of an iridectomy does not keep open as in the form pre-

viously mentioned, as it is small, and soon closes on account of the sclera not being healthy.

After the operation, the tension remains normal, the vision slowly deteriorates. If the condition of the sclera shows disease, it is a sure sign that it will get worse.

In one illustrative case that I have in view, when first seen by me the disease had been present for several years. R.V. — 6/9. L.V. — 6/24 two letters of, and all the accompanying conditions of chronic glaucoma, each T. plus, decided.

I advised an operation but my patient refused as her husband was very ill. The course of treatment I had sketched was at once to trephine, use eserin locally, and "The Combined Treatment."²

However, I had now to use C.T. alone. At the end of six months E.V. — the same. Optic disc more vascular and each T. full.

At this time she learned that her husband had cancer of the bladder. Consequently I could only give C.T. very irregularly during these last eight months of 1914, a most serious handicap.

At the end of 1914 the condition R.T. full. V. with glasses 6/12 and 6/9 two letters. L.T. full. V. with glasses 6/24. She still refused an operation.

In the spring of 1915 she came again to see me, now R. eye V. with glasses 6/36. L. eye V. with glasses 6/60 —. Each T. plus 1.

She now agreed to an operation. I found a condition of the sclera present which was not expected. The left eye was first operated upon and the operation was easily done, the sclera being firm and apparently healthy. The right eye was operated upon with much less ease, and this was altogether due to the condition of the sclera. This latter gave a doughy feeling to the knife, quite a contrast to the firmness of the left sclera. The knife penetrated the sclera with difficulty. The incision was enlarged with the edges of the keratome of the sclerectomy slowly, as it gave to the pressure of the knife, in-

stead of cutting quickly. The operation was quite successful.

At the end of one year, tho Tn., the vision of R. eye remained 6/36. Left eye V. — 6/36.

At the end of the second year, R.V. — 6/60 and gradually failing. L.V. — 6/18, and then began to lose ground.

Now in 1920, the condition of R. eye was T; p.l. only. L. eye Tn., V. — 6/60, so she could guide herself about the house and attend to her household duties.

I have frequently heard the dullness of the knife remarked upon in doing an iridectomy in cases of this form of glaucoma; but subsequent experiences have made me think that the unrealized diseased condition of the sclera was often doubtless the cause.

Sometimes the diseased condition of the sclera can be, if not diagnosed, at least strongly suspected, if the finger tips used in estimating the T. be sensitive and educated: The T. plus of the left eye was certainly always more elastic than the T. plus of the right eye. The relative conditions of the sclera, as shown by the operation, made me realize that the difference in the feeling of the eyes thru my finger tips, which otherwise I should not have thought of any importance, meant a great deal, and was of distinctive value as to prognosis. The diseased condition of the sclera of the right eye, evidently more rapid in its progress than that of the left, appears to account for the earlier loss of sight of the right eye, as this eye, when the patient first consulted me, had much the better vision and was apparently the less diseased. Hence the condition of the

sclera should be as carefully gauged as possible in every case.

In cases where there is no cupping of optic disc, as we have to deal with a cyclitis, unassociated with a tissue change of the optic nerve and sclera of any moment, the prognosis is good, unless in some extreme or neglected cases, if the treatment I have advocated is strictly adhered to.

But in cases with cupping of the optic disc, the prognosis as to ultimate recovery is always unfavorable, owing to the extent of the tissue change. When the sclera is already involved, blindness is not so far away.

However, when this form is seen early, i. e. before tissue change is so extensive, a favorable prognosis can be given, if the following conditions be carefully carried out, viz.: that a trephine operation be done, and that internally mercury and the iodid be steadily used for a long time, i. e. 6 months, 1 year, or longer, or still better, the "Combined Treatment." That the eyes be kept under the influence of eserin is not now necessary, unless in exceptional cases.

Normal tension can only be brought about and maintained by the trephine operation. But this is only one factor in the treatment. The medical part, local and internal, is in its way very important. It seems to me that only by the union of the operative and medical forms of treatment can one be said to have used full measures in endeavoring to bring about a successful issue.

I have neglected to mention that in all of my cases of glaucoma I have at suitable stages taught my patients persistently to use a gentle massage of the eyeball thru the upper eyelid.

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NOTES, CASES AND INSTRUMENTS

A NEW RETINOSCOPE.

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As his accommodation fails it becomes increasingly difficult for the ophthalmologist to note exactly the point



Fig. 1.—a, Mirror obtained by silvering surface of concave lens. b, Concave mirror by silvering convex surface of plano-convex lens. c, A combination of b with plane mirror; giving effect of convex lens at sight hole.

of reversal when using the retinoscope. Particularly is this true when working at a shorter distance than one meter, as is sometimes necessary when the

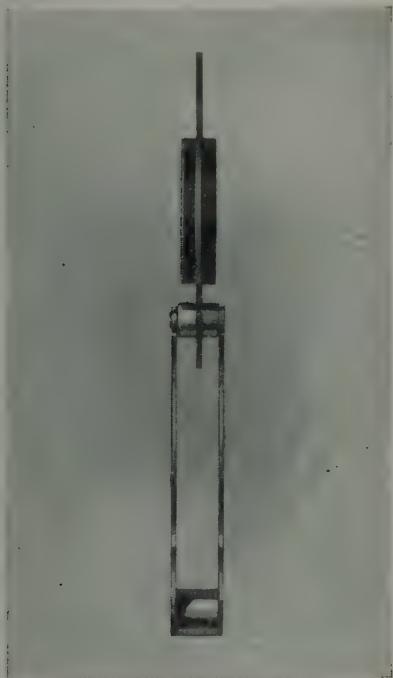


Fig. 2.—Bennett's retinoscope showing two mirrors placed back to back.

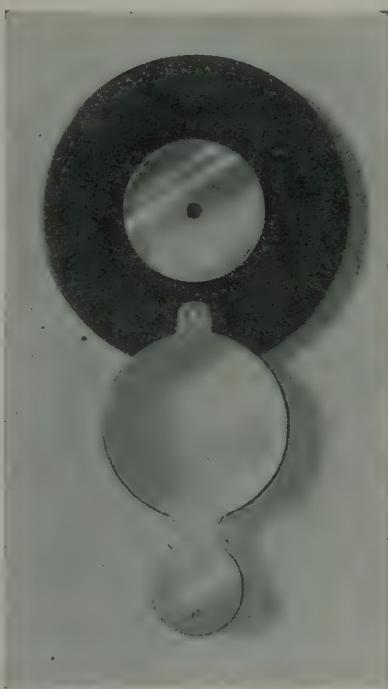


Fig. 3.—Retinoscope, front view open.

"scissor motion" is present. To overcome this difficulty I have devised a retinoscope with a small + 1.00 lens behind the sight-hole, which I have



Fig. 4.—Retinoscope closed to carry in pocket.

used with great satisfaction for some time. Even to one accustomed to the flat mirror, occasionally the concave mirror is preferable, particularly in cases of high myopia, so an attempt was made to combine the two in one instrument.

As usually constructed, the concave mirror is exactly what the term denotes, a planoconcave lens, with the reflecting amalgam on the flat surface as shown in Fig. 1a. So that if a flat mirror and a concave mirror be mounted back to back, with the amalgam removed at corresponding points for a sight hole, one would get the effect of a minus lens, thereby increasing the trouble of the presbyopic examiner, or if a hole were drilled thru both lenses, no assistance.

In the retinoscope to be described, I have taken advantage of the fact that a plus spherical plano lens with the reflecting amalgam on the convex surface, becomes in effect a concave mirror as in Fig. 1b; and at the same time is a + lens and can be combined with a flat mirror, so as to overcome the examiner's presbyopia. In this instrument, the concave mirror is a + 1.00 sph.-plano lens, mounted back to back against a flat one, Fig. 1c, the amalgam is removed at corresponding points, so that the effect of + 1.00 sph. is available for either side. After working with it for some time, I find it very satisfactory, enabling me to observe slight movements much more accurately than thru the simple perforation. I beg to commend it to my colleagues who are, like myself, no longer in the first blush of manhood.

The Buffalo Optical Co. of this city carried out my idea in a very admirable manner, and I wish to express my appreciation of their efforts.

FIXATION OF THE EYEBALL PERPENDICULAR TO THE SECTION.

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ISERLOHN, GERMANY.

Translated by H. W. Aufmwasser.

The difficulties experienced in making a smooth cataract section can be

overcome if one succeeds in fixing the eye perfectly, without exerting pressure on it. If this is attained the eyeball will not recede before the knife and will not turn around its axis. Then one can make the incision easily, and guide the knife with surety thru the anterior chamber without injuring the iris or causing premature loss of aqueous humor and falling of the iris upon the knife. Finally one can locate the counterpuncture at leisure, and complete the incision at one or two strokes of the knife and form a conjunctival flap. The problem is: how is a perfect fixation of the eyeball possible without injury to it?

None of the numerous methods so far introduced answered this purpose. The one arm fixation forceps which are mostly used, straight or curved, only fix the eyeball at one point, about which it rotates with the manipulations of the knife.

The double arm fixation forceps which have been used heretofore must be placed parallel to the section, and require therefore a forced manipulation of the hand, which readily causes a pressure or pulling on the eyeball. In spite of various recommendations, their use has almost been discontinued, and one finds in the text books illustrations with one arm forceps.

The different varieties of Pamard's spears have not been used to any great extent, as they were inadequate. Then there are many other procedures, which were temporary imitations, that never came into general use. Other operators transfix the eyeball with a ligature. This procedure prolongs the operation, causes wounds of the conjunctiva, which, thru hemorrhagic infiltration, can disturb the further operative action, places the conjunctiva in annoying folds and adds to the discomfort of the patient.

The application of several one arm forceps or a combination of forceps or ligature, requires assistants whose hands are in the operative field and hinder the operator in his manipulations. An assistant who must perform much work must be perfectly trained; which becomes necessary at each

change of the personnel, and even the most careful and able assistant cannot prevent that an eye may become endangered, and even exposed to loss.

If until now the one arm forceps have been generally preferred, in spite of all their shortcomings, instead of other fixation methods, the reason for this is probably due to the fact that they can be so easily handled, disturb the eyeball the least, and enable the operator to dispense with assistants.

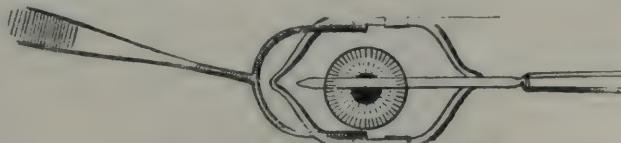


Fig. 1.—Perlmann's double fixation forceps.

Two years ago I published a new method* with the help of a fork-forceps, which is just as simple as the method with the one arm forceps. By fixing the eyeball vertical to the section, I removed all the drawbacks of the old methods, without adding new ones. I employ double arm forceps provided with suitable markings, which by a bend in the handle permits the knife to pass beneath it. The illustration shows its application. The instrument can be attached and detached like the one arm forceps; but obviates all other of the above mentioned disadvantages.

The slightly opened (spread) instrument is placed vertically in the vertical meridian upon the eye and close to the limbus. Then there is above a space of 3 mm. for the formation of a conjunctival flap. To put the forceps in place with wide open prongs is not recommended, because it would produce disturbing folds of the conjunctiva. Now close the prongs of the forceps and place the same toward the nose so that the operative field is free, then you have the eyeball tightly fixed and in control. The eyeball can be easily pulled forward and in this manner one decreases the pressure upon the eyeball and holds it firmly against the knife, so that in making the section the whole of the cutting power of the knife is used. In one or two strokes the

scleral incision is made and one can form now a higher or lower conjunctival flap as may be desired. A catch (lock) on the forceps is entirely superfluous. I never employ forceps with locks, as I am of the opinion that a fixation forceps should be so that it can be removed without delay, instantly.

The method of fixation as mentioned above I have now used for eleven years or more, and it has proved to be of great value, not only in cataract sec-

tion but also in all other conditions which require fixation. I have never had cause for improving this method, as it fulfills indeed the purpose mentioned in this communication, to put the eyeball in absolute control of the operator without endangering the eyeball or without prolonging or complicating the operation.

Since I have published my method two years ago, I have been asked from different sources both at home and abroad about the source of supply of the forceps and later I received to my great pleasure a number of agreeing, even enthusiastic, notices. Today the method is used in a large number of eye clinics, among them many university clinics. The object of this communication is to bring it to the notice of my colleagues in America.

TRAUMATIC MYOPIA.

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The report of the two following cases of temporary myopia of traumatic origin may be of interest.

Case 1. P. C., aged 26, machinist. In turning a block of wiring, a piece of wire snapped and struck him in the left eye. The injuries were as follows: several ecchymoses in the left upper lid, perforation of the skin near the center of the inferior orbital margin, laceration of the temporal aspect of the ocu-

*Klinische Monatsblätter für Augenheilkunde, 1919, vol. LXII, page 488.

lar conjunctiva and involving also the subjacent episclera, and an inverted Y-shaped opacity of the cornea deeply situated, probably in Descemet's membrane. The tension was somewhat lower than in the fellow eye; V= 20/200. Between the optic nerve head and the macula, the ophthalmoscope revealed an edematous area of irregular contour and about 2 disc diameters in extent. The diagnosis was, obviously, commotio retinae.

The lacerated conjunctiva was sutured, atropin instilled, and the case managed in the routine way. Recovery was rapid and complete; the corneal opacity cleared up and the commotio retinae disappeared. On the fourth day of the injury the eye was retinoscoped and found to be myopic, with — 2.50 S. V=20/30. The patient insisted that prior to the accident, vision in that eye was as good as in the uninjured eye. The next day the patient took in addition a — .50 cyl. axis 180°. This refractive state continued two days longer, when the eye measured emmetropic, and vision equaled 20/15 and no glass would be accepted.

The question arises what caused this temporary myopia? Various possibilities suggest themselves. Was the myopia due to increased corneal curvature consequent upon the injury to Descemet's membrane? Did any alteration take place in the composition of the aqueous humor augmenting its refractive index? The myopia could not be attributed to irritation of the ciliary muscle, for the eye was fully atropinized. Was the myopia axial because a weakened sclera could no longer afford adequate resistance to the pressure of the intraocular fluids? The commotio retinae, per se, could hardly account for it; if anything, it would reduce the antero-posterior diameter of the eyeball. Was there a relaxation of the suspensory ligament of the lens which gave a greater curve to the ventral surface of the lens? One might speculate in several other directions without coming to any definite conclusion.

Case 2. D. R., 20 years old, automobile mechanic. While repairing a car,

something fell into his left eye. There were the usual symptoms accompanying the presence of a foreign body in the cornea. The patient received no medical attention for several days. Then, on account of the extreme discomfort, he went to a general hospital, where unsuccessful attempts were made to remove the foreign body. He was then referred to an eye hospital, where the house surgeon was equally unsuccessful in his efforts, and the patient was requested to return the following morning for a magnet extraction. I saw the patient the evening of the same day.

Examination revealed a piece of metal protruding slightly into the anterior chamber above and temporally and just within the limbus, the wound of entrance being invisible and apparently occluded. An electromagnet was applied over the site of the foreign body without effect. A small corneal incision was made, and with the tip of the magnet a piece of steel about 2 mm. long and 0.2 mm. wide was readily recovered. The visual acuity of the eye was not impaired, the patient reading 20/20 with ease. Atropin was instilled, the eye dressed, etc. For the next two days progress was uninterrupted. On the third day the patient, while straining at stool, felt a sudden gush of warm fluid in the injured eye. He now complained of excessive lacrimation, and of markedly disturbed vision.

Upon investigation, the anterior chamber was found to be obliterated, the iris in contact with the posterior surface of the cornea, and vision 20/200. There was no doubt that a rupture of the cornea had occurred with escape of the aqueous. The media were perfectly clear, the fundus negative. Retinoscopy demonstrated a myopia of 8 diopters. The following day the anterior chamber had become reestablished, the refraction was emmetropic, and vision normal.

The transient myopia may be explained thus: following the escape of the aqueous, the crystalline lens assumed a more anterior position which resulted in a proportional shifting forward of the focal points of the dioptric system of the eye.

NEURORETINITIS FOLLOWING SALVARSAN INJECTION.

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WILLIAM BEVERLY WHITE, M.D.

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In a survey of the literature there are cases reported of neuroretinitis following the injection of arsphenamin. Nevertheless, some American authorities claim that we do not have serious optic nerve diseases following the administration of salvarsan. Würdemann¹, for instance, in a most excellent paper, states that neuroretinitis appearing in syphilitic conditions following administration of salvarsan is due to the spirochete toxin and not the drug, theorizing that arsenic causes a liberation of spirochete toxins, which in turn is the direct cause of the neuroretinitis.

Cohn² has demonstrated that an idiosyncrasy for arsenic does exist, and this would seem to be substantiated by a case reported by him, in which a retrobulbar condition developed following the administration of eight minims of Fowler's solution in 24 hours. Zeiss³, also Mukai⁴, report cases in which neuroretinitis followed the administration of salvarsan. Quoting de Hass⁵ result of examination of 8,000 patients, he was able to make the clinical diagnosis of neuroretinitis arsenicalis in 56 cases, and in 53 of these arsenic was present in the urine.

De Hass statistics relate to the artisan employed in various arts in which arsenic is used, showing conclusively the relationship between arsenic and optic nerve disease.

CASE.

History: Mr. B., age 24, single, usual diseases of childhood. When discharged from army vision was normal. Developed syphilitic lesion during latter part of July, 1920, immediately consulted his family physician. Treatment was instituted during the next week, when he received his first injection of salvarsan. As further treatment, he was given an injection of salvarsan once a week for the following four weeks. He suffered but little nausea and there was nothing to indicate a contraindication of the drug. The morning following the fifth injec-

tion he noticed a blurred sensation relative to his right eye, and consulted his family physician, who in turn referred him to us.

Examination: Pupil responds to light, accommodation. Fundus: Disc markedly swollen (4 D.), cloudiness of surrounding retina, arteries small, veins large and very tortuous. Floating opacities in vitreous. Vision: 20/200. Central scotoma for red and green.

L. vision 20/20. Fundus apparently normal, sinuses negative, Wassermann negative.

The pertinent factors of this case which we wish to emphasize are:

First. Less than four weeks after exposure, or to be more exact, during the first week of the appearance of the initial lesion, this patient received his first injection of arsphenamin.

Second. The marked elevation of the papilla. Edema of the surrounding tissues; central scotoma for red and green; vision 20/200. This condition developing 12 hours after the fifth injection of arsphenamin.

In conclusion, wish to state that when seen during latter part of December, 1920, Wassermann was negative, and there was no change in the above mentioned eye condition.

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CORNEAL AND SCLERAL MEASUREMENTS OF INTRAOOCULAR TENSION WITH BROWN TONOMETER

EDWARD J. BROWN, M. D.

MINNEAPOLIS.

A suggestion of Dr. C. W. Hawley led to the following work.

If palpation of the eye with the fingers has any value the measurement of the intraocular tension with a tonometer applied to the same part of the eye but inside the lids ought to have a more definite value. I therefore adopted the routine practice of applying the tonometer in every case, first over the sclera and later on the cornea. For the first few scleral measure-

ments I had the patients look in such direction that the instrument might be applied just outside the limbus and between the superior and external recti. I soon found that it was simpler and easier to have the patient look directly forward and apply the tonometer between the limbus and the superior rectus insertion.

I believe these scleral measurements have distinct value. First, they reassure the patient that the operation is painless and harmless. Second, they can be used in the case of nervous children and women who cannot be controlled sufficiently to get satisfactory corneal readings. I have made sixty-six such comparative measurements, as shown in the following table. The scale of my instrument being based on mercurial manometer, I have subtracted ten from the readings to make them approximate the Schiötz standard.

No.	Cornea.	Sclera.
1	35-35	42-42
2	35-30	40-40
3	29-33	40-40
4	30-30	50-50
5	30-34	45-40
6	28-33	45-55
7	30-28	40-40
8	28-25	32-32
9	25-25	40-38
10	26-38	40-50
11	28-28	38-38
12	22-22	25-25
13	22-26	20-23
14	25-25	30-45
15	28-31	40-45
16	26-24	35-40
17	32-38	40-40
18	32-34	40-40
19	32-30	40-40
20	31-30	50-50
21	40-30	60-45
22	40-33	45-60
23	26-36	45-50
24	40-26	55-40
25	40-45	55-55
26	34-26	45-52
27	36-36	40-40
28	25-26	34-40
29	26-28	40-40
30	each 30 to 35	40-40
31	30-30	38-38
32	28-38	35-45
33	38-25	50-45

34	28-28	43-48
35	26-30	40-50
36	30-40	27-45
37	38-37	45-50
38	25-26	40-35
39	25-40	30-50
40	28-25	40-40
41	33-33	55-55
42	25-22	25-40
43	32-38	32-50
44	32-34	50-50
45	32-30	40-38
46	25-23	32-32
47	35-22	45-45
48	33-34	50-50
49	30-30	38-50
50	28-28	38-39
51	25-28	38-40
52	26-29	31-45
53	32-35	30-42
54	35-35	45-47
55	25-25	30-35
56	32-37	45-48
57	26-28	45-45
58	22-26	32-35
59	30-33	50-50
60	35-22	42-35
61	18-33	33-55
62	35-35	47-47
63	35-	30-
64	35-35	40-40
65	32-32	45-45
66	35-38	32-42

REMARKS: No. 7. R. fingers at 12 inches, L. with compound myopic correction 20/30. Right anterior chamber practically nil, both fields about 15 degrees.

No. 25. Chronic glaucoma, L. blind for years.

No. 30 and 46. Child aged 8 years, tension reduced by ten days' use of scopolamin.

No. 18 and 58. Boy aged 10. Pain of eyes and head, temporal cups of both discs and in L. vessels undermined. Five days after use of scopolamin pupils 5 mm. and tension plus, great relief and lowering of tension from use of eserin 1/1000.

No. 61. Male, 56. Blind ten years. Right, hypermature cataract; L. posterior staphyloma. V. — 20/40 with — 9.50 — 2.50 cyl. axis 165°. Has had no treatment for three years.

The average of 130 comparative measurements gives about 11 mm excess to sclera above corneal tension.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

ROYAL SOCIETY OF MEDICINE. SECTION OF OPHTHALMOLOGY.

Meeting of January 14.

DR. JAMES TAYLOR, President.

Steel Retained in the Eye.

MR. G. WINFIELD ROLL showed a man who had a fragment of steel embedded in his eye for 18 years. Soon after the particle entered the eye, a skiagram located it in a direction up and out. The man said he was blinded for a week immediately afterwards, but the trouble then passed off, and he had not had any eye difficulty since. When seen a few weeks after the accident vision was 6/6, and the media were clear. A tiny nebulous spot was now to be seen in the neighborhood of the limbus.

Mr. Roll did not consider it a case calling for interference, as the vision was good, the eye was quiet, and a good time had elapsed since the accident. Latterly, however, vision had gone down to 6/18. The only change in the ophthalmoscopic appearances after all this time was the development of an area of atrophy below the foreign body, with a slight deposition of pigment at the same site. There were also a few vessels, which were either remnants of the choroid vessels, or were collaterals. He mentioned a case from the AMERICAN JOURNAL OF OPHTHALMOLOGY, in which a foreign body had remained in an eye 29 years; and said he did not see why there should be any limit to such residence provided the body was aseptic and was not causing trouble.

DISCUSSION.—Mr. W. T. Holmes Spicer thought the changes in the neighborhood of the choroid were due to the presence of the foreign body. Siderosis sometimes followed from such bodies in the eye, and in this case there was probably a local siderosis. One man under his care had a piece of

metal in his eye three years before any siderosis developed, and then the eye turned a rust color.

Cupping of Disc Without Glaucoma.

MR. A. HUGH THOMPSON showed a case in which there were discs with large intermarginal cups, without, as yet, any symptoms of glaucoma. The tension was normal. Sometimes the eyes were misty, but the patient, a woman aged 52, never saw rainbow colors, and no lens opacity could be made out. He considered that this case was on the way to the development of glaucoma: it was now at a stage when various opinions would be sure to be expressed.

Coloboma of Macula.

MR. MALCOLM HEPBURN showed a case of coloboma in the macular region. It was difficult to justify that term, but if ever there was such a case, surely this was one. It had a pearly white center with a definite ectasia on the temporal side of the patch. He considered the condition to be very rare.

Demonstration of Instruments.

PROFESSOR SALOMONSEN, of Amsterdam, demonstrated an ingenious set of instruments for photographing and demonstrating to students the interior of the eye.

MR. HUDSON showed a new form of *perimeter*, and Dr. RAYNER BATTEN demonstrated, by means of rubber balloons, what he termed *deep tension*, which, he argued, had its analogue in the eye, and when present in that organ indicated the imminence of glaucoma. It was elicited and measured by dimpling under a definite pressure.

Physiologic Cup and Glaucoma.

DR. RANSOM PICKARD, of Exeter, read a paper entitled: "Variations in the Size of the Physiological Cup and Their Relations to Glaucoma." The cases reviewed in this paper were a consecutive series, eliminating only cases of actual glaucoma and other diseases affecting the disc. The objec-

tion might well be raised that the patients came because they had some affection of the eyes, and that they were not simply a part of the general population; still, the total numbers dealt with in the later age-groups corresponded very closely with the general population age-groups in the county (Devon). Glaucoma was so rare under forty years of age that cases might be taken, from this standpoint, as normal.

The older the patient, the greater the assumption that pathologic changes had occurred, glaucoma accounting for a large proportion of these. Where necessary, the tonometer for pressure, and the screen for the field of vision were employed. The shape and size of the disc and the cup were carefully drawn in each case, and transferred, by means of carbon, to graph paper. The area of each disc was then measured, and the results were reduced to a percentage, 100 being taken as the total area of the disc. The cases were grouped in ten-year periods. The myopic cases had large cups, tho there were only two groups (16-25 and 26-35 years) in which the largest myopic cup was not exceeded by a hyperopic cup.

Explanation of the alterations in normal disc cups involved, he said, many difficulties. An alteration in the size of a cavity, situated in a solid like the sclerotic and filled with a viscous fluid, might conceivably occur under three conditions: (1) no alteration in pressure; (2) tension from without, as in the contraction or disappearance of nerve fibers or fibrous tissue. In the present series cases of this kind were excluded. (3) There might be pressure from within, i. e., pressure exerted by the vitreous, as in glaucoma. He submitted a two-fold suggestion: that the tissues of all discs were not equally strong, and that small increases of pressure acting on the weaker discs over long periods might cause an enlargement of the cups in those cases, but not to the extent of interfering with vision.

Dr. Pickard went on to show, by means of the epidiascope, the various shapes of physiologic and glaucomatous

cups he found. In the former there was certainly pressure from within. The glaucoma cup was usually a simple and symmetric enlargement of the physiologic cup; in a small number the conical enlargement was added on to the cylindric form. If most of the glaucomatous cups were enlargements of the physiologic cups, caused by internal pressure; then, presumably, smaller degrees of pressure, acting on cups in which the tissues were weak, would cause lesser degrees of enlargement, without necessarily producing any deterioration in vision.

Very varying degrees of tension came on in middle life without symptoms arising from it. Pressure was not the only factor; the resistance of the disc must also be taken into account. Only those cases should be included under the term glaucoma in which there was sufficient pressure to interfere with the function of the organ. In the cases of high pressure without such interference the pressure must be regarded as a danger signal.

In these latter cases an accurate and thoro investigation should be periodically carried out, and all predisposing causes as far as possible eliminated. The author admitted that his main contention, that there was a tendency for the physiologic cup to enlarge with advance in age, was not proved, but only inferred. Much might be done, however, to confirm or refute the idea by systematically studying and following out a few cases over a course of years, with accurate diagrams taken at certain intervals.

DISCUSSION. Mr. A. Hugh Thompson said the paper supported the view that there was a distinct relation between a large physiologic cup and a glaucomatous cup. In more than one of his own cases there was an undoubted glaucoma in one eye, and a large overlapping physiologic cup in the other. Also, when ordinary glaucoma had occurred in one eye, there was a considerable likelihood of the same condition developing in its fellow. The author's suggestion that physiologic cups were changed into glaucomatous ones owing to unequal resistance of the lamina cribrosa, coin-

cided with his own view. But he did not think that was the usual mode of causation. The ordinary glaucoma was that of the text-books, in which the pathologic condition began at the margin of the disc. He did not think the author had sufficiently emphasized the distinction between ordinary shallow cup, such as most discs presented, and the perpendicular cup, the latter often overlapping, so that the vessels came to the edge of the cup and disappeared from view, until again seen in the lamina cribrosa.

Dr. Rayner Batten spoke of the need of some method of recording cases of central cupping; he did not think the recording of the area alone supplied what was chiefly wanted. The dangerous cups were indicated by their shape. So long as the cupping was restricted to the center it might be looked upon as Nature's trephine hole. Nearly all the cups mentioned in Mr. Pickard's paper seemed to have been central. The cups he, the speaker, was acquainted with generally came quietly up on the temporal side and expanded from there; rarely on the nasal side. Cups would increase under normal pressure. When deep tension and a large physiologic cup coexisted, it seemed to require a slight cause to render the eye glaucomatous.

Mr. M. S. Mayou said the pathologic difference between the two forms of cupping was very great. The physiologic cup was merely the cone of nerve fibers passing into the nerve, whereas the glaucomatous cup was a pushing back of the whole lamina cribrosa. This produced not only a steep-sided cup, but often, in sectioning the disc, one could see the cup bulging out under the sclera on either side. Cupping was dependent not only on the intraocular tension, but also on the condition of the nerve fibers as they passed thru the lamina cribrosa. The essential difference was seen when the cupping passed to the margin of the disc.

Mr. Pickard, replying on the discussion, spoke of his careful work on borderline cases, for it was in those he considered that the true cause of glaucoma would be revealed. He did not

consider the enlargement of the ordinary physiologic cup was the cause of most cases of glaucoma, but in a group of cases that was so.

H. DICKINSON.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Philadelphia, January 4, 1921.

DR. BURTON CHANCE, CHAIRMAN.

Burns of the Conjunctiva.

DR. P. N. K. SCHWENK presented a young man showing two kinds of burns, one a superficial burn of the left eye and the other a deep burn of the right eye. In this case both the palpebral and bulbar conjunctivae were excoriated. The ordinary treatment of such a case is olive oil but in the opinion of Dr. Schwenk a vegetable oil should not be used, a mineral oil such as cosmolin being preferable if one would use an oil. Dr. Schwenk prefers to treat these cases with irrigations of cold sterile water repeated frequently, no other medication being used. He wishes to emphasize the fact that he thinks dionin is contraindicated in these cases.

DISCUSSION.—Dr. McCluney Radcliffe agrees with Dr. Schwenk as regards the use of dionin, thinking that it should not be used in the acute stages but should be withheld for use in old cicatrices, etc.

Dr. Burton Chance: Dionin should be used in old cases but not in the acute stages.

Dr. L. F. Appleman stated that in cases such as the above he uses a 1% solution of holocain in an oily base, principally on account of the antiseptic properties of this drug as well as its analgesic action.

Retained Foreign Body in the Eye.

DR. SCHWENK also presented a man aged thirty who had a penetrating wound of the globe, the X-rays showing a foreign body to be present. The magnet had been used unsuccessfully upon two occasions. The patient now has a retained foreign body, full visual acuity and a comparatively quiet eye.

The case was presented on account of the question of treatment.

Bilateral Traumatic Cataract.

DR. MCCLUNEY RADCLIFFE presented a boy who, while driving cattle, accidentally struck himself across the face with the lash. Following the blow double cataract developed. Under general anesthesia Dr. Radcliffe operated the right eye with a keratome; the left eye being operated by the same method at a later date under local anesthetic. The right eye healed well and there was no subsequent operation, while the left eye still shows some slight reaction subsequent to a capsulotomy. Vision R. 6/6, L. 6/9. The operation performed was the one of Dr. Risley. The keratome is entered at the limbus, the capsule opened with the point of the knife and the cortex milked over the blade of the instrument, especial care being taken on withdrawing the knife to proceed slowly in order to prevent any possibility of iris prolapse.

DISCUSSION.—Dr. Schwenk. After entering the keratome make gentle pressure backward, this being the secret of the operation.

Dr. Chance stated that Dr. Radcliffe's case is but a second instance of simultaneous bilateral cataracts from moderate force which he has seen. In the past twelve months he has operated upon a man in whose eyes were complete cataracts which had been produced by a flying leather belt.

Dr. William Campbell Posey said that he could not remember having seen a similar case of bilateral traumatic cataracts caused by blunt force. He supposed there must be some rupture of the lens capsule, probably posteriorly.

Cataract Showing Hereditary Tendency.

DR. RADCLIFFE also showed a case of a young woman, aged thirty-four, with a cataract first noticed six years ago, shortly after a miscarriage. A combined extraction was done. The patient has three aunts, on her father's side of the house, who have cataracts which appeared about the third decade of life.

DISCUSSION.—Dr. Posey agreed with Dr. Radcliffe that soft cataracts which affect the comparatively young were often hereditary, and cited several cases in his own practice. He dwelt especially on one case, that of a young man who had lost his mind coincidentally with his sight, and had recovered his sanity upon the successful removal of his cataracts by operation.

Perforating Wound of the Globe at the Limbus with Recovery.

DR. J. MILTON GRISCOM exhibited a case illustrating the conservative treatment of a severely injured eye. The patient, a male aged 25, was struck in the right eye on November 30, 1920, by a flying piece of wood. When admitted to the Wills Hospital a few hours later there was a gaping wound at the limbus, up and in, with prolapse of the iris and vitreous. Under rest in bed, atropin and ice compresses in two weeks the wound had healed with an anterior synechia, and a cyst had developed in the sclera at the site of the injury. This grew rapidly in size until it was three by four millimeters. A compress bandage was applied and a solution of alum, eserin and adrenalin instilled twice daily; with the result that at the time the case was exhibited the cyst had entirely disappeared, the eye was quiet and the tension was normal. Dr. Griscom thought the case was of interest because it illustrated the value of postponing enucleation, in what at first may seem a hopeless condition, until the case has been under treatment and observation for a few days.

DISCUSSION.—Dr. Schwenk mentioned a case in his service a number of years ago who had several iris cysts and stated that the case resembled the present one very much.

Distension of the Ciliary Segment of the Globe.

DR. BURTON CHANCE exhibited a case of distension of the ciliary segment of the globe in a young man who had had bilateral cataracts which had been extracted two years ago. When discharged in 1919 there was nothing abnormal noted in either eye. Today the patient returned to the hospital be-

cause of impaired sight in his left eye and swelling of the globe in the anterior segment. A huge bladder-like swelling of the entire superior aspect of the segment was present, in the nasal third of which were two or three purplish elevations resembling uveal tissue seen in staphylomatous ectasias. The distension extended for some distance below the external angle of the extraction cicatrix, which was well within the cornea and seemed to be free of iris tissue. Chance was inclined to regard the case as one of cystic distension of the ciliary body caused by a disturbance of the body and probable inclusion of the lacerated tissues during the healing of the wound after the extraction of the cataractous lens.

Fuchs' Superficial Marginal Keratitis.

DR. L. W. HUGHES presented for DR. WILLIAM ZENTMAYER a case of Fuchs' superficial marginal keratitis. The patient was a colored man, 25 years of age, with a history of inflammation in his left eye of seven months' duration and in the right eye of two months' standing. The patient admitted that he had gonorrhea ten months ago, also an inguinal adenitis seven months ago. In the right eye there was a waxy concentric superficial infiltrate, invading the cornea from the periphery except on the nasal side, the width of this zone of infiltrate varying from two to three millimeters. The line of extension was sinuous, slightly denser than the other parts and presented fine granulation like elevations which stained faintly.

Many fine, straight vessels invaded the affected area from the limbus. The center of the cornea was clear and there was slight ciliary injection. In the left eye the condition was similar to that in the right, except that the infiltrate was denser and there were some foci near the center of the cornea; and in this eye the vascularization was less marked. The Wassermann was negative and the von Pirquet positive. Under small doses of old tuberculin there has been a gradual improvement in the eye condition, also in the patient's general health. Dr. Zentmayer wished to have stated that he had been aided

in reaching this diagnosis by Dr. C. S. O'Brien.

DISCUSSION.—Dr. Posey thought the case one of hyperplasia of the epithelial element of the cornea, and vascularization not unlike that of the salmon patch in interstitial keratitis. He thought the case would probably prove to be specific.

C. S. O'BRIEN, Secretary.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

January 11, 1921.

DR. ROBERT FAGIN, in the chair.

Foreign Body in the Vitreous.

DR. E. C. ELLETT presented a young man who was struck in the right eye by a piece of steel while working on a truck January 6. There was no irritation of the eye. There was a small scar on the cornea and lens capsule and well developed lens opacities. Vision 1/200. X-ray showed a foreign body in the ball. Dr. Ellett proposed to attempt the extraction with a giant magnet and in the event this procedure failed to try to remove it thru a scleral incision.

DISCUSSION.—Dr. Lewis said that the lens picture was very pretty and advised watchful waiting.

Dr. Stanford could not understand how a steel body could remain suspended in the vitreous and leaned to removal by the posterior route with the magnet.

Dr. Blue agreed with Dr. Sanford.

Dr. Cook spoke of a case in which a piece of steel was removed by way of the anterior route with the magnet.

Dr. Simpson advised the posterior route.

Bilateral Trephining and Complete Iridectomy for Glaucoma.

DR. ELLETT presented a lady upon whom he had operated each eye for glaucoma. July, 1913, she had an acute attack in right eye, the vision having been previously normal in each eye with the correction of 1.50 D. of myopia. This attack apparently subsided under treatment and she had no fur-

ther trouble until March, 1915, when she said that she had another attack in the right eye. Dr. Ellett saw her in June, 1915, at which time the tension was 37 right eye and the vision 20/30 with correction. The field was contracted. The eserin which she was using was stopped and the tension went to 57. On June 12 a trephining with complete iridectomy was done. On June 13 she had an acute attack in the left eye and, on June 15 the same operation was done on this eye. Now, 5½ years after the operation, the fields are exactly the same as they were two months after the operation. Vision 20/25 each eye, with glasses, and the tension is 20 right eye and 17 left eye. There is apparently no filtering scar and the good result is probably due to the iridectomy.

DISCUSSION.—Dr. Levy said that he is a firm believer in iridectomy over trephining.

Dr. Shea asked Dr. Ellett if he ever applied treatment to the nasal ganglion in cases of glaucoma. Dr. Ellett replied that he had not.

Dr. Ellett said that he had tried to show cases of long distance results at the society meetings. In this particular case he did not believe that the trephine had done good but that the good result was due to the iridectomy.

Tumors of the Lids.

DR. FAGIN presented a case of tumors of the left eyelids. This case was presented to the society previously, also to the Tennessee State Medical Society two years ago and later to the Colorado Ophthalmic Congress. The tumors were on the inner surface of each eye lid. The diagnosis from a clinical and microscopic standpoint has been very difficult to make. Several hundred oculists have examined this patient, most of whom said that they had never seen anything of the kind. Dr. Finnoff's findings from a microscopic section of one of the growths were those of lymphomata or new growths similar to tonsillar tissue. Now the growths are only on the left lids but are larger than they were a year ago. Dr. John M. Maury applied radium to the right lids on two

occasions in the fall of 1919 and without the least disturbance the growths promptly disappeared. Six months ago the lymph nodes of the right side of the neck greatly enlarged and several were removed surgically by Dr. Crisler. Microscopic examination did not show malignancy. Two months ago the left cervical nodes enlarged greatly. One week ago Dr. Chapman administered treatment with X-ray with the almost complete disappearance of the swelling.

DISCUSSION.—Dr. Blue suggested Mikulicz' disease.

Dr. Chapman said that he used diffuse X-rays to the neck, long bones and spleen.

Dr. Lewis said that the condition was a relative to Parinaud's disease.

Dr. Levy had thought of leprosy, and thought it might be some form of glanders.

Dr. Ellett said that it could not be Parinaud's disease because it was not a conjunctivitis, and that Mikulicz' disease involves the lacrimal gland, whereas this case was not such involvement; and asked why not use radium on this left eye as it had been so efficacious in the right eye.

Dr. Fagin said that this man was seen by Dr. Jackson and Dr. Knapp at Denver and that Dr. Jackson said that he had never seen anything of the kind before, thereby proving its rarity. He suggested the trial of radium or the X-ray on one lid at a time as a scientific inquiry. He stated that the tumor had grown in the last six months.

Foreign Body in the Eyeball.

DR. FAGIN presented a boy 14 years old who was struck in the right eye by a part of the head of a nail three years ago. The eye was treated by an oculist at Monroe, Louisiana, but the foreign body, which penetrated the cornea just above the pupil, was not found or removed. Vision was soon lost. The iris has become discolored and atrophic. The vitreous is filled with opacities, and since three days ago the eye has been very red and painful. He had advised immediate enucleation of this blind, painful eye but the mother had refused to have it done.

DISCUSSION.—Dr. Stanford said that the tension was the same in each eye and advised removal.

Dr. Simpson advised the same.

Dr. Fagin said that this boy had been in the state school for the blind, altho left eye vision was 20/20.

Faint Opacity of Cornea and Chorioretinitis.

DR. FAGIN presented a young man of 16, who had only light perception in right eye. The patient denied ever having had pain or inflammation in the eye and claimed that the vision had been poor all his life. The left eye was normal. The right pupil was dilated with homatropin and a faint opacity of the cornea in its center was visible. There was a marked chorioretinitis in the macular region. The teeth were peg shaped and almost typically Hutchinson in character. Family history negative. Wassermann today negative.

DISCUSSION.—Dr. Lewis thought it a beautiful and typical case with Hutchinson teeth.

Dr. Ellett said that there was a healed interstitial keratitis and said that we probably overlook the eye-ground in cases of interstitial keratitis. He thinks nothing of one negative Wassermann.

Dr. Blue suggested the exhibition of KI and then trying another Wassermann.

EDWIN D. WATKINS, Secretary.

JOINT MEETING OF THE CHICAGO OPHTHALMOLOGICAL AND THE CHICAGO NEUROLOGICAL SOCIETIES.

December 16, 1920.

DR. ALFRED N. MURRAY, CHAIRMAN.

Polioencephalitis Superior and Inferior.

DR. G. B. HASSIN reported the case of a young man, 21 years of age, an imbecile since early childhood, who entered the neurologic service of the Cook County Hospital, complaining of inability to swallow (six weeks' duration), to judge distance (since childhood) and speech troubles. The examination revealed a paralysis of all the cranial nerves (from the third to

the twelfth), inability to judge distance (disturbance of spatial sense) and marked defects in speech (dysarthria) and deglutition (dysphagia). The clinical picture was that of ophthalmoplegia and bulbar paralysis. The sensibility reflexes, including the pupillary, the genitourinary organs were all normal.

The patient died suddenly two days after his admission to the hospital. The histologic examination of various portions of the brain showed marked degeneration of the gray matter, especially of the midbrain and medulla, and proliferative changes in the glia tissue. The latter showed a great wealth of protoplasmic glia cells, various types of gitter-cells, many gliogenous formations, such as myelophages, and abundance of fat like substances within gitter cells. Infiltrative inflammatory phenomena and hemorrhages were absent. Occasionally scattered red cells, mostly enclosed with gliogenous formation, could be seen within the changed glia cells.

The degenerative changes in the gray substance were in the form of chromatolysis, neurophagia, fat infiltration, broken up myelin, etc. The cortical areas were also involved, especially in the occipital lobe, the angular gyrus, cuneus and precuneus. The pia arachnoid, in this region of the brain, showed enormously distended meshes infiltrated with mesothelial cells, gitter cells and abundance of hemorrhagic foci. Fat like substances were also found in the choroid plexus.

The third nerve showed signs of secondary degeneration, in its early stages; namely, an abundance of so-called Marchi globules enveloped by proliferated glia tissue (Schwann cells).

The histopathologic changes generally resembled those to be found in degenerative diseases of the nervous system, such as amyotrophic lateral sclerosis, subacute cord degeneration, multiple sclerosis, etc., being, however, especially pronounced in the midbrain and medulla.

The conclusions to be derived from the histopathologic studies of this case are, (1) that the subarachnoid space

derives its contents, in this case fat, from the brain tissues proper; (2) that the choroid plexus is probably not so much concerned in the production of the cerebrospinal fluid as in aiding in its purification and rendering it more passable.

DISCUSSION.—Dr. Hiram J. Smith said that the causal sites of ocular paralysis in general might be divided into orbital and intracranial. The intracranial might be considered as supernuclear. Nuclear fascicular—that is, fiber from nucleus or deep origin to the surface, or superficial origin and lesions of nerve trunk between superficial origin and the orbital fissure. In extensive progressive ophthalmoplegia the lesion was nearly always nuclear. Supernuclear lesions, that is, of cortex association centers and intracerebral tracts, caused conjugate paralyses of eye muscles, seldom isolated paralysis, with the exception of ptosis. In this type of conjugate paralysis, the eyes usually were able to turn toward the affected side of the brain, but not toward the opposite, that is, "look to the lesion," as contrasted with conjugate paralysis of pontine origin, where the eyes might turn from the lesion.

Bilateral ophthalmoplegia was not necessarily due to bilateral involvement of the nuclei. Fibers from the nuclei of a given side passed to the nuclei of the opposite side so that a lesion of the right third nucleus might cause a disturbance of the muscles of the opposite side as ptosis. The affection of the opposite side in a case under observation, cleared up in 48 hours, probably thru compensatory action of the unaffected nucleus, as the paralysis on the side of the lesion persisted.

In progressive nuclear involvement, one would naturally look for adjacent nuclei to be affected at the same time, or in succession, and this happened. The third and fourth, or sixth and seventh, were involved together, as well as adjacent nuclei of other cranial nerves.

The diagnosis of the cause of ocular paralysis might be suggested by the type and extent of the trouble. In nuclear paralysis the underlying neuro-

logic affection would be cleared up, usually thru the finding of other manifestations than the ocular. The characteristics of multiple sclerosis were readily perceived. In bulbar paralysis the early involvement of hypoglossus and glossopharyngeus was met with. In myasthenia gravis double ptosis was seen early, but the rapid fatigue of muscles of head and neck, especially muscles of mastication, was characteristic. Nevertheless, many obscure clinical pictures presented themselves. In Dr. Hassin's case he had an opportunity to observe, postmortem, what was actually taking place during the course of the disease.

Dr. Peter Bassoe thought it would be profitable if Dr. Hassin would emphasize the distinction between that disease, polioencephalitis superior and inferior caused by other infections, and the purely degenerative affections of the same regions. A similar problem had been worked out in the case of the spinal cord. For a long time everything was called myelitis without sufficient distinctions between inflammations, degenerations, and vascular lesions.

Dr. H. Douglas Singer stated that according to the statement of the essayist, the spinal fluid was absorbed apparently both thru the arachnoid villi and thru the choroid plexus. He wondered what was the source of the spinal fluid—if it was true that it was absorbed at both sides of the brain. The usual view was that the choroid plexus acted as a gland to secrete the fluid, but Dr. Hassin apparently had an altogether different view.

Dr. Michael Goldenburg said that he was under the impression that the spinal fluid was secreted by the choroid plexus, and that the epithelium covering it was merely a filter.

Dr. Hugh T. Patrick asked how the fat and epithelial cells in the choroid plexus got there from the spinal fluid, and if anybody had ever found fat in the spinal fluid in this sort of a case.

Dr. Hassin, in closing the discussion, said that he did not intend to consider in detail the important physiologic points suggested by the pathologic

studies of a remarkable case. He merely wished to demonstrate their probable significance.

The masses of lipoid substances in the gray matter of the midbrain and medulla were striking, but nobody ever stated the fact of their presence in the subarachnoid space and the choroid plexus. Evidently, fat like substances had not been looked for in these regions, or proper methods were not used. In fact, very few histopathologic studies of so called hemorrhagic superior polioencephalitis had been recorded, the authors contenting themselves with repeating what Wernicke said. Schroeder and Spielmeyer were the first to point out that Wernicke's polioencephalitis was not an encephalitis at all. In his (Dr. Hassin's) opinion the only true superior polioencephalitis was represented by epidemic (lethargic) encephalitis in which the inflammatory phenomena were principally, though not exclusively, confined to the midbrain; in the Wernicke's type the morbid process had the same localization, but is of a degenerative, and not of inflammatory character.

As to the probable function of the choroid plexus and the spinal fluid, he wished to state that according to some authors, the cerebrospinal fluid originates partly in the brain, partly in the choroid plexus. The abundance of fat in both these structures indicated that their contents were wholly derived from the brain tissues. In the case under discussion, these contents were lipoid substances; in cerebral hemorrhage they would be blood pigment and so forth. The choroid plexus, therefore, was to be looked upon as a filter for the cerebrospinal fluid which it rendered passable thru the various channels of absorption. Generally speaking, the study of pathologic brain conditions might help to solve problems which so far defied the efforts of the ablest experimental workers.

The Pupil in Health.

DR. E. V. L. BROWN stated that according to Salzmann the pupil in health had a diameter of approximately 4 mm.

The consensual reaction depended

upon the stimulation of the rods and cones in the relatively small area of the macula. The stimulus was then carried by the optic nerve to the chiasma, where partial decussation took place, thence via the tractus opticus with the pupillary fibers lying dorsolateral to the corpora quadrigemina, and finally to the nucleus of the oculomotor nerve, which functioned as the pupil nucleus as well, thru the fibers which crossed over from the right to the left side. Therefore any stimulus of the right macula went to the left pupil, as well as to the right and was then sent down the left oculomotor to the sphincter of the iris on each side, the left pupil narrowing at the same time the right did. This test was of the greatest value in establishing the functional integrity of the most vital part of any injured eye. Many a patient who had just suffered a severe accident to a considerable portion of the front of his eye could easily and quickly, and honestly, be told that the eye was not lost, even when the cornea was cut, the anterior chamber full of blood, the iris prolapsed or the lens dislocated, for the pupil of the fellow eye narrowed when light was thrown into the injured eye. One of the uncanny things about the consensual pupil reaction was the fact that in rare instances of disease of the cortex such as tumor of the occipital lobe, etc. the one eye really did not see, or rather the cortex of neither side saw, yet the pupil motor stimulus was sent up the one optic nerve, across to the other side and down that oculomotor nerve and the pupil of the opposite side narrowed as perfectly as if the light and color and form perception were perfect.

Widening of the pupil took place thru irritation of the sympathetic. The pupil widening fibers left the spinal cord at the level of the upper two dorsal and the lower cervical vertebrae. Fibers from the upper thoracic ganglion join with some from the inferior cervical ganglion. Here there is a union with the hypoglossal. The carotid branches were then given off and the pupillodilatator fibers proceeded in the skull to the Gasserian ganglion and united with the first branch of the tri-

geminus. So united, they proceeded to the eye via the two long ciliary nerves to the dilator sheet of muscle in the back layers of the iris. They did not pass thru the ciliary ganglion at all.

Any irritation of the cervical sympathetic could, therefore, produce dilatation of the pupil. Furthermore, the irritation or stimulation of any sensory nerve might produce a dilatation of the pupil. The path here was to the cerebral cortex, the oculomotor nucleus and to the iris via the third nerve, ciliary ganglion and short ciliary nerves to the spincter pupillae, which relaxed and allowed the dilatator to work unopposed. Furthermore, the pupil widened upon any psychic stimulus, and volitional impulse and any vivid mental concept.

DISCUSSION.—Dr. H. Douglas Singer stated that he often found recorded, "Pupils sluggish to light," and he had never been able to satisfy himself as to what most people meant by sluggishness. Did it mean that the reaction was slow or that the degree of contraction was diminished?

In his opinion, as to the pupillary light reflex pathway, the fibers that conveyed the stimulus for the light reflex left the optic tract before it reached the pulvinar. They apparently left in the region of the thalamus and traveled along the inner side of the thalamus. This seemed proven to him by two cases of tumors seen many years ago, involving the back part of the third ventricle and damaging the optic thalamus on both sides, in both of which there had been Argyll-Robertson pupils.

Dr. Hugh T. Patrick stated that the dictum of Uhthoff that even if there was more illumination of the pupil on one side, the pupils remained equal, was wrong. He had once ventured this opinion in Germany, and had been corrected with characteristic Prussian abruptness, but had many times since then corroborated his observations.

Another curiosity could be referred to as a normal pupil: It was known that occasionally an individual could voluntarily dilate his pupil, by picturing to himself some peculiarly horrible

scene, generally from his own experience.

Dr. Patrick said he would be better pleased if Dr. Brown would speak of the segments of the cord instead of the vertebrae.

Dr. Ralph C. Hamill said that in testing the pupils, especially of colored men with very dark irides, it was difficult to tell whether there was a light reflex or not. Dr. Brown had mentioned the fact that the near sighted individual had large pupils and he wondered whether in some individuals where the pupil was under more or less spasm small changes of size would be visible. Also, in testing the pupils of a great many men in a short space of time, as was done with some of the men in the training camps, it was observed that there were certain kinds of pupils that corresponded to the degree of pigmentation of the iris.

Dr. I. Leon Myers thought that the influence of the sympathetic nervous system and especially that which was noted in emotional disturbances, fright, etc., was not the only one that brought about dilatation of the pupil. It had been noted many years ago that in stimulating the cortex of an animal while it was completely anesthetized and the stimulation was strong enough to produce epileptiform fits, the pupils would promptly dilate. This had no connection with stimulation of the cortex, when it produced conjugate deviation of the head and eyes.

Dr. Robert von der Heydt stated that as to light and dark irides, there were at least two reasons why eyes with dark irides did not respond to light as well as those with lighter colored irides. One was a sluggishness in response on account of the weight of the added pigmentation in the dark irides. In addition light would penetrate a light colored iris more readily on account of its greater transparency, and the retina would receive more stimulation for that reason.

Dr. H. W. Woodruff spoke of the statement made in the standard textbooks on ophthalmology that "inequality of the pupils was always pathologic." Reference had already been

made to the larger pupil in myopia. This also held when one eye was myopic and one hyperopic, namely, in anisometropia. In such a case one pupil was distinctly larger than the other. When he first began the practice of ophthalmology he did not know this and supposed a patient with inequality in the pupils must have a serious nerve lesion. For this reason, in examining these cases the refraction should be known.

Dr. Charles P. Small said that the difference in the reactions in the normal pupil were illustrated in a case seen recently. The patient was a man in perfect health, with all the laboratory examinations negative, who was refused an increase in life insurance because he was said to have an Argyll-Robertson pupil. The pupils were widely dilated and almost immobile but they did react very sluggishly when carefully examined. He did not know why he had such a very feeble reaction, and wished some of the neurologists would explain it to him.

Dr. C. W. Hawley was reminded of a case similar to Dr. Small's which he had reported. His patient had widely dilated pupils all her life without pupillary reaction. Suddenly the left pupil was contracted to the usual size and developed reaction. She came to have the pupil dilated to look like the other. He told her to go home and pray that the other would contract like the left.

As to one pupil dilating more when it was receiving more light than the other, he had seen a similar case within two or three months. During the examination a friend of the patient asked why one pupil was dilated more than the other, and he thought it might be because that eye was receiving more light than the other. On turning the patient around he got the opposite effect and proved that this theory was correct.

Dr. Brown, in closing the discussion, in reply to Dr. Singer said he had always understood sluggishness to refer to the rate of reaction rather than the degree. He was glad to hear Dr. Patrick emphasize the fact that direction

of light influenced reaction, due to the fact that one eye had more stimulus.

Dr. von der Heydt had answered the question about the pigmentation and the hypermetropic eye with the small pupil. It should also be noted that iridocyclitis was more frequent in lightly pigmented eyes than in heavily pigmented ones.

ROBERT VON DER HEYDT, Corresp. Sec.

COLORADO OPHTHALMOLOGICAL SOCIETY.

January 15, 1921.

W. F. MATSON, presiding.

Capsulotomy After Thirty-three Years.

C. E. WALKER, Denver, presented a man aged fifty-five years upon whose left eye a capsulotomy had been successfully performed thirty-three years after injury by a piece of wire, which had passed thru the cornea and lens. The vision of the eye with a plus 11 sphere was 20/200.

Spontaneous Rupture of Lens Capsule.

C. E. Walker, Denver, presented a man, aged sixty-one years, in whom, sixteen years after cataract extraction, complete spontaneous rupture of the posterior capsule of the lens was found to have occurred. The posterior capsule had been unruptured at the original operation. The vision of the eye at the time of report was light perception.

Retrobulbar Neuritis.

W. C. and W. M. BANE, Denver, presented a woman aged forty-three years who had been presented at the December meeting on account of retrobulbar neuritis, which had begun about November 22, 1920. The consensus of opinion at the December meeting had been that the ethmoids and sphenoids should be drained. On December 7 the vision had been R. almost nil, L. 5/30 —. On December 22 submucous resection of the septum was done, and the sphenoids were drained. On December 23 the vision was R. counting fingers at three feet, L. 5/20 —. There was steady improvement in the vision, which on December 30 was R. 2/60, L. 5/7.5 — 2. On

this date both middle turbinates were amputated, and the left posterior ethmoid cells were exenterated. No pus was found in any of the sinuses. On January 14 the vision was R. 3/60 +, L. 5/4 — 3.

DISCUSSION.—Melville Black, Denver. The negro girl presented at the last meeting on account of neuroretinitis was operated upon at the county hospital, the remainder of the nasal sinuses being cleaned out. The last time she was at the clinic the vision was normal in each eye, and the swelling of the optic disc was very much diminished, probably to two or three diopters.

G. F. Libby, Denver. Dr. Gallaher is of the opinion that in removing a certain amount of blocking, which exists in these cases as regards the venous circulation, we get an improvement of the nutritional condition of the optic nerve, especially of the retrobulbar portion.

Melville Black, Denver. I do not think there is anything especially new in that hypothesis, altho there is undoubtedly something in it. That the whole process is due to such an etiology I question, for there are important connections between the drainage channels of the sinuses and the optic canal. The relief from blocking produced by opening up the sinuses explains the rapid improvement obtained from the operation, much more readily than the idea that the disturbance is purely a matter of infection. The subsequent improvement is probably another affair. I believe actual infection will be proved as time goes on.

D. H. Coover, Denver. In such cases as this I have found definite improvement of vision only where there was a great deal of hemorrhage, and I have the habit of telling the rhinologist to let the patient bleed as much as possible. I remember three or four cases in which there was profuse hemorrhage and improvement was rapid, but the cases in which there was very little hemorrhage did not improve so rapidly.

W. C. Finnoff, Denver. The negress Dr. Black referred to still has about two diopters of swelling, and Dr. Coover told me that she still had some swelling

round the sphenoidal sinuses, so that I said I thought it was important to get rid of the sphenoidal trouble completely, otherwise we were likely to get atrophy of the optic disc.

W. H. Crisp, Denver. There seems to be some difference of opinion between eminent rhinologists as to the possibility of diagnosing purely hyperplastic conditions at the time of operation on the sinuses. I understand that Dr. Gallaher feels able to determine when he encounters hyperplasia, but other rhinologic friends tell me that they do not believe it possible to be sure of the condition at operation. Some time back I had a patient who showed a remarkable improvement in the eye condition for a few days after a nose operation which was followed by profuse hemorrhage; but the eye condition to a large extent relapsed later on.

Dr. Finnoff. I think in all these cases of hyperplastic rhinitis we have a definite infection, altho not with organisms that produce pus.

F. R. Spencer, Boulder. There is also in many cases a relationship between disturbances of the ductless glands and hyperplastic ethmoiditis.

Disciform Keratitis.

W. C. and W. M. BANE, Denver, again presented a woman aged twenty-seven years, who had been shown two months previously on account of a disciform keratitis in the left cornea, the center being one mm. downward and outward from the center of the cornea. A blood Wassermann test and the result obtained from the use of mercury were negative. The center of the disc had for a time had the appearance of separating from the healthy cornea. On February 3, 1921, the vision of this eye was 5/20, the opacity was thinner, and blood vessels had entered every part of the diseased area.

DISCUSSION.—G. F. Libby, Denver. Although at first this looked like so-called disciform keratitis it now has the appearance of an ulcer of the cornea which is healing.

W. C. Bane (closing). During the development of this case there were two or three whitish deposits in the general gray mass, which have disappeared entirely under the use of cinnamat of soda.

Epithelioma of Eyelid.

W. C. and W. M. BANE, Denver, again presented a man aged sixty-two years, who had been shown December 18, 1920, on account of a small epithelioma at the margin of the lower eyelid. On January 1 the diseased tissue had been removed with a sharp curet, and the raw area at once cauterized with trichloracetic acid. After twelve days the wound had contracted very little, there being a crescentic notch in the lid 4 by 7 mm. in diameter. One dose of radium (25 mgs. for 6 hours) had just been used, and a second application of two hours would be made in two days' time. (A supplementary report on January 28 stated that all inflammation had subsided and the notch was one-half the original size, the surface having healed.)

DISCUSSION.—E. M. Marbourg, Colorado Springs, suggested that where radium could not be obtained excellent results could be had from the use of scarlet red on the superficial growths.

F. R. Spencer, Boulder. One of the tungsten production companies in Boulder will probably be able shortly to furnish radium emanations.

Melville Black, Denver. When cicatrization is complete this eyelid will be rather unsightly, and it may be necessary to do some plastic work. This could perhaps most satisfactorily be based upon a V-shaped incision at each corner of the eye.

Recurrent Iridocyclitis.

H. R. STILWILL, Denver, and MELVILLE BLACK, Denver, presented a woman aged sixty-two years, who had first come to Dr. Stilwill in December, 1913, on account of an attack of iridocyclitis. There were old anterior synechiae on the anterior capsule of the lens. After two weeks' treatment the eye became quiet, but similar attacks occurred in July, 1915, and July, 1916. In August, 1917, the patient came to Dr. Black with a record of a white scum having formed in the left cornea in the preceding January. The corneal opacity had not disappeared, but the eye had been free from redness and soreness for several months before her first visit to Dr. Black. No trouble had developed in the right eye until about a month pre-

viously. There was an area of episcleritis below the cornea with a slight pebbly appearance of the lower third of the cornea. A Wassermann test was negative.

The patient had been under the care of a starvation specialist and was very much reduced in weight. The trouble with the right eye had started while the patient was under the starvation treatment. No elevation of temperature followed an injection of 0.5 mg. of old tuberculin, but there had been a local reaction at the site of the injection. Tuberculin treatment was kept up for about one year, at the end of which period the eye seemed to be free from inflammation. In June, 1920, the right eye again became red and photophobic. It was necessary to substitute homatropin on account of an attack of dermatitis having been produced by atropin. There had been more or less continual iridocyclitis since that time. Thyroid extract had been used without benefit.

DISCUSSION.—E. M. Marbourg, Colorado Springs. I noticed that this woman's joints were gouty and her arteries hard.

G. F. Libby, Denver, mentioned a suggestion recently thrown out by a medical friend, to the effect that gout was probably due to focal infection.

E. R. Neerer, Colorado Springs. I suggest that the patient should be tested by the complement fixation test for old gonorrhreal infection. I have seen two cases clear up wonderfully after the diagnosis had been established in this way. The second thing I should consider would be iridectomy.

Dr. Black. The question of doing an iridectomy has presented itself to me, but I hesitated to operate on this one eye because of the extremely unsatisfactory nervous condition of the patient. I was afraid she might go out of her mind if the operation deprived her for a time of the vision of this one eye.

C. E. Walker, Denver. Even if the patient is so flighty the iridectomy ought to be tried; perhaps tried first on the worse eye to demonstrate the action of the operation to the patient, al-

tho you would not expect much from that eye.

Cholesterin Crystals or Asteroid Hyalitis.

MELVILLE BLACK, Denver, presented a patient on account of the presence in the vitreous of each eye of a great number of glistening particles, perhaps of the nature of cholesterin. Dr. Jackson had suggested that the case might be one of asteroid hyalitis. The crystals were much more massive than in the usual cholesterin case.

DISCUSSION.—Edward Jackson, Denver. The appearance of the right eye is very striking. These do not look like the ordinary scintillating crystals of cholesterin. They are not so metallic, are not angular, and are all about the same size. They are white like snowflakes. There is not so much movement of the particles as in the marked cholesterin cases, that is to say, the range of movement is not so great. They seem to be in a consistent vitreous, which does not allow them to float about in the snowstorm fashion of the typical cholesterin shower.

Congenital Lens Dislocation with Iris Displacement.

W. C. FINNOFF, Denver, presented a Mexican boy on account of bilateral congenital dislocation of the crystalline lens, the right dislocation being up and out and the left up and in. The most striking feature of the case was that at about 11 o'clock in each eye the iris was pushed forward against the posterior surface of the cornea, and was fixed at this point, altho the remainder of the iris was tremulous.

F. R. Spencer, Boulder, referred to a case of bilateral congenital lens dislocation in a giantess who showed a number of other anomalies.

Edward Jackson, Denver. In many cases of congenital dislocation the lenses are not so large as normal. In this case the lenses seem almost normal in size, and it may be that a full sized lens being drawn up in this way accounts for the pressure against the cornea. Probably the best way to start

on the refraction of these eyes would be with the ophthalmoscope rather than with the retinoscope. I think that rather more than half of the pupillary space is aphakic.

Lens Dislocation. Glaucoma. Posterior Sclerotomy.

W. F. MATSON, Denver, presented a man aged sixty-two years who in 1882 had received a blow from a fist on the right eye. Cataract was noticed in 1892. The lens was dislocated back into the vitreous, and a history of the vision having improved about 1910 suggested that the lens had dropped back about that time. Early in January, 1921, he developed an attack of glaucoma and the eye became stony hard. Posterior sclerotomy was done, sufficient vitreous being evacuated to produce minus tension. Under the further use of eserin and hot applications the eye had kept quiet, but only one week had elapsed since operation.

Steel in Crystalline Lens.

C. O. EIGLER, Denver, presented a man who twenty-five years previously had received an injury to one eye from a piece of steel. The eye had been badly inflamed for three or four weeks, but there had been no pain since. The piece of steel was plainly visible, being held firmly between the cornea and crystalline lens at the upper part of the pupil. The eye was not irritable. Vision of this eye was light perception. Should anything be done?

DISCUSSION.—C. E. Walker, Denver. Altho the eye ought to be watched it should be left alone as long as the piece of steel does not drop down.

Edward Jackson, Denver. If you interfere in any way that I have been able to think of you will certainly have to puncture the lens again, and in all probability will produce complete cataract. There seems to be no evidence of siderosis. The man should be warned that if he goes away and trouble begins he should consult a competent ophthalmologist.

Wm. H. CRISP,
Secretary.

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DETAIL IN THERAPEUTIC MEASURES.

"Trifles make perfection, but perfection is no trifle." Nowhere does this apply with more truth than in ocular therapeutics, whether by medical, surgical, or hygienic measures. It is true in other lines of work. The great commander is a master of detail, so that no missed connection can disarrange his plans. The successful business man must understand the processes of manufacture or exchange that he has to direct. The surgeon's mastery of technic makes him the smooth finished or effective operator; and only years of close observation, thought and effort to do things just so, give him that mastery.

One operator prefers one operation and does it with brilliant success, another prefers a different operation and with it is equally successful. Each has mastered the technic of his favorite procedure, by becoming perfectly familiar with every step in it, so that they follow each other with perfect smoothness and move straight to the

desired result. Each understands fairly the method of the other, and has probably tried it. But if they were to exchange operations, the strain on the operator would be increased, and the results not nearly so good.

A class of medical students was asked the treatment for ophthalmia neonatorum. All mentioned silver nitrat; but not one in ten gave the frequency or strength for the applications; and not a single one went into those details of its application that make the difference between success and failure. The whole medical profession has heard something of the use of tuberculin, but not one in one hundred has mastered those trifles of detail that enable him to use some one preparation with real efficiency. It is the overshadowing importance of detail in our work, that justifies and compels specialization in medicine.

To speak of a discussion of detail in technic as a "kindergarten exercise" may disarm criticism; and permit those who will always be incapable of good surgery to pass the article by as unworthy of their attention, in the be-

lief that it is intended for some beginner who needs that kind of instruction. Very rarely does the beginner know enough of its value to appreciate the consideration of such trifles. Its real value and significance will be appreciated by the experienced surgeon, who has almost perfected his technic by many hours of anxious thought given to just the point discussed. He may not be ready to give up the method he has already chosen and practiced, but he is ready to do some more thinking about it; and so he welcomes the view of a colleague who also thinks about it minutely, but takes a little different point of view.

Probably we are all too ready to ignore the importance of detail. We note that a certain article is on a certain general topic, that it deals with some particular operation; but we fail to extract the one grain of gold, the one minute detail of modification that it suggests, which really justifies the writing of it. Often the author is largely to blame for this, by putting in so much else, that the one point which should make his communication valuable is concealed in the mass of more general statements. But we all have the habit of looking for and judging by the general statements, and not seeing the detail that can really help us.

Some years ago the writer described a form of cataract knife. It was not essentially new, for practically every form of knife was used in the first fifty years after Daviel; and those whose names these knives bear today have not done more than suggest trifling changes. But in this instance the point that justified calling attention to it was almost universally overlooked. Even those who tried the knife, and liked it and continued to use it, generally failed to notice this particular point; until their own experience forced it on them. It was that the blade filled the wound until the corneal section was almost complete. The back of the knife pressing down just as hard as the cutting edge pressed up, made the fixation of the eyeball comparatively simple and easy.

Any cataract knife of the right width

does this, the Beer's knife, if properly proportioned, does it. Some operators choose what they call a "broad Graefe knife," ignoring the fact that the distinctive character of the Graefe knife is its narrowness, a character that enables it to change direction in the wound (which it ought not to do) and makes the puncture and counterpuncture possible with the very least exertion of force. It was the control of the two ends of the section by puncture and counterpuncture that gave the Graefe knife its vogue, even at the cost of more difficult fixation. It was to secure puncture and counterpuncture without sacrificing fixation, that led to the choice of a slightly broader knife.

One may think that cataract extraction is such an important operation that everything about it becomes important. Relief of human disability and suffering is so important to our patients, and important to us, that everything that helps it becomes important. And nowhere does this prove more true than in the correction of errors of refraction. No larger field for remunerative attention to detail opens before the ophthalmologist, than this of the correction of refractive errors. The man that leaves refractive cases to his assistant, who has not time to "waste" over minute changes of the direction or strength of a cylinder, may be justly celebrated for operative successes based on his mastery of detail; but his patients never write books or magazines to tell the story of their relief by his glasses.

The eye is a small organ at most. It has often been neglected by the general physician or surgeon on that account. It would seem that one who takes it as his especial field for therapeutic effort should realize the importance of small things. To do things nearly right may give one a mediocre standing in his profession. Always to do them exactly right, so far as this is humanly possible, is what brings the higher success. In the making of an application to the everted lids, in the fixing of an eyeball, in the exact placing of a lens before the eye there is all the opportunity in the world for success or failure.

E. J.

PAPERS FOR THE WASHINGTON CONGRESS.

Ostensibly an international Ophthalmological Congress convenes to listen to scientific papers and the discussions upon them; altho there are other things, as the opportunity for personal acquaintance, private discussions, the seeing of specimens and apparatus that can rightly claim a large share in contributing to the success of such a meeting. It is worth while to inquire, what kind of papers and what number of them are likely to do most for the success of the gathering at Washington next April?

The number of members already enrolled, and the inquiries regarding the Congress that have been received from all parts of the world, indicate that it will be the largest gathering of ophthalmologists that has ever been held in any country. It is safe to assume that every topic of interest to any ophthalmologist will find some interested hearers and discussers in that gathering. Of course, the interests of each member are varied enough for many to be keenly alert to anything new that can be said about any live subject connected with this branch of science; and each session will be less fatiguing and more interesting if it is divided between several subjects and many speakers.

There will be eminent visitors from Europe, South America and Asia, who will each present a paper on some important topic. But it will, also, be very interesting to hear these men express their views on various other topics. The opportunity for this will be afforded only by having these topics presented by papers, that our eminent visitors will have opportunities to discuss. It is very likely that not all the papers offered for the Washington Congress can be admitted to the program; but it is certain that a better program can be arranged if the Committee in charge can have a rather large number and a wide variety of papers to choose from.

If any good paper is prepared and time cannot be found for it in the program of the Congress, the national so-

society meetings for 1922 will still be open for its presentation to the profession; and thru them it will get a good hearing. Probably some of these meetings will be arranged so that they can be attended by foreign ophthalmologists, while in this country to attend the Washington Congress. It is possible too that those in charge of preparing the programs for these societies next year will have some difficulty in securing papers of high value and interest when the International Congress attracts some of the best. Even local societies in America should arrange meetings for next year of more than average merit.

There is every reason that each worker in ophthalmology, who thinks he has some material worth presenting to his colleagues, on a subject that is timely and likely to meet some of their broad interests, should go to work, get the educational benefit of preparing such paper, and then offer it for presentation where it will meet the best available opportunity for a hearing. The influence of the Washington International Congress should be felt in the program of every national and local ophthalmologic society in the United States.

E. J.

BOOK NOTICES.

American Academy of Ophthalmology and Oto-Laryngology. Transactions of the Twenty-fifth Annual Meeting. Clarence Loeb, Editor. 510 pages, illustrated. Published by the Society.

This volume, substantially bound in cloth, comes to us less than five months after the meeting, the proceedings of which are recorded in it. This is rather an exceptional achievement in the publication of Transactions. It is all the more notable because this is something of a memorial volume celebrating the first quarter century for this most western of special medical organizations.

The proceedings of the Academy for all the twenty-five years of its existence are here systematically indexed both by names of authors and by topics considered. These indexes make

the papers and discussions that have occupied the meetings of this organization more readily and completely accessible than those published by any other medical society in the world. The value of such indexes will only come to be appreciated as students and writers in the future use them in tracing to its sources the literature of the various subjects considered. Such indexes are a greater service to the profession and humanity than whole volumes of the average medical transaction.

The volume will be more immediately valued for the halftone portraits of all its former presidents, who may well feel honored to appear in such a collection. There are 24 of these. Dr. Alt, the first president, having served for two years. Of these, 17 are still living, indicating the tendency of the Academy to choose young men for its office bearers. This has some important connection with its broad, inclusive, progressive policy, which is illustrated in gathering the largest membership of any society devoted to these specialties in the world, in requiring an examination and certificate in the specialty practiced, in doubling its dues to provide funds to assist in original research, in arranging a course of intensive graduate study for its members, and not least the publication of indices to all its transactions, something not undertaken for most medical societies.

Only about half the papers published in the volume are devoted to ophthalmology. Several of them have been published in this JOURNAL. The others include discussion of such topics as: Ocular Symptoms Due to Intranasal Disease; Heterophoria from Nasal Disease; Some Variant Forms of Keratitis; Minor Affections Associated with Refractive Muscular Errors; Closure of Subconjunctival Fistulae; Methods of Applying Prism Tests; Conservation and Extirpation of the Lacrimal Sac; Chorioretinitis with Detached Retina in Syphilis; Compensation for Eye Injuries; Cataract Operation; Trachoma. Most of these topics gave occasion to general discussion in which some of the most valuable thought regarding them was expressed.

The volume is similar in style to its predecessor in this series of transactions and is exceptionally free from blemishes and errors. It lacks the proper page headings, which have now been generally adopted in medical books because they add materially to the ease and convenience of consulting them. There are other transactions that still exhibit this defect. But the general tendency to progress which the Academy has shown ought to guarantee an early adoption of the better plan.

E. J.

American Ophthalmological Society, Transactions, Volume 18, Fifty-sixth Annual Meeting, 1920. Pages 450. Illustrated, 20 plates, three in colors. Published by the Society, T. B. Holloway, Secretary.

This volume contains biographic sketches of Drs. S. D. Risley, and R. L. Randolph, two of the seven of its members who had died during the past year. Then come the minutes of the meeting, the papers read before it, and seven theses by candidates for membership who were elected at this meeting. Two of these theses were published in this JOURNAL. The subjects of the others were "Diplopia, With Description of Cyclocephalic Monster," by Dr. Emory Hill; "Increase of Hyperopia and Diabetes," Dr. W. H. Roberts; "Visual Disturbance in Hysteria," Dr. Adolph O. Pfingst; and "Total Keratoplasty," by Dr. J. W. Burke.

Of the 28 papers read before the Society and here published nearly all are accompanied by discussions which followed their presentation. As in the preceding volumes the theses submitted by candidates add materially to the scientific interest of these transactions. They should have a wider circulation than they have heretofore enjoyed.

The Sympathetic System.—Le Sympathique—et les Systèmes associés. Anatomie clinique sémiologie et pathologie générale du système neuro-glandulaire de la vie organo-végétative, par A. C. Guillaume. 8°, 396 pages, 40 ill. Paris, Masson et Cie.

In these days of inquiry into the functions of the glands of internal se-

cretion and the sympathetic system of nerves, with their relation to the functions and health of the body, this comprehensive treatise is very welcome—for it is founded upon the newer ideas of the morphophysiologic and pathologic changes which regulate the so-called vegetative system.

Disturbances of the functions of the neuroglands of organic life and their diseases are legion; and the latter do not come under any nerve classification. The author has made for them a direct doctrine.

The first edition was published in September, 1919, and has been followed by one of October, 1920, a practically new book, as the author has not been contented to simply bring in a few new ideas, but has added eight new chapters, of special interest being the one on the intervention of the system in pathologic processes and its reactions in the course of various diseases. He gives a clear exposition of all of the necessary facts leading to comprehension of the problems of general anatomy, physiology and pharmacology, following with comments upon the pathology and showing how it is possible to clinically examine patients with affections of the sympathetic system and to interpret the results gained thereby.

It is a practical, clinical guide to the physiopathology. Nothing essential to the knowledge of the problem of the vegetative life has been omitted. It explains all that has been accomplished to date in acquiring knowledge of the functions of the internal secreting glands and their relation to the sympathetic nerve elements. It is a book which is impossible of abstract, not for empiricists, but for those scientific practitioners who seek the cause.

Pasteur said: "Without theory practice is but a routine born of habit. Theory develops invention." It thus conducts the searcher for truth along the right way, as well as guides the practitioner. The American Pottinger is quoted: "Remember there is a patient who has the disease, as well as the disease which has the patient." As may be well understood, there is constant reference to the eye, pupillary re-

flexes, etc., thruout the book. A lengthy bibliography is added, but there is no index, which, in a volume of this character, would be of great value. The table of contents hardly gives sufficient reference for a busy practitioner to find any special subject. Some forty original diagrams elucidate the anatomo-physiologic descriptions. H. V. W.

College of Physicians of Philadelphia, Transactions. Third Series, Volume 41, 1919. Pages 416. Published by the College. H. R. M. Landis, Editor.

The Transactions of the Section on Ophthalmology of the College, as published in this JOURNAL, make up 36 pages of the present volume. In addition there are 5 papers read before the College itself which deal with matters of ophthalmic interest. These take up "Concussion and Contusion Injuries of the Eye in Warfare," "Reeducation of the Blind Soldiers," "Research Work on Problems of Aviation;" "The Army School of Ophthalmology;" and Plastic Operations on the Nose and Eyelids."

E. J.

A Physician's Anthology of English and American Poetry. Selected and arranged by Casey A. Wood, M.D., and Fielding H. Garrison, M.D., 12 mo. 370 pages, Oxford University Press. London, New York and other cities.

This collection of short poems is dedicated to the memory of Sir William Osler, and was intended as a tribute for his seventieth birthday. The collection had passed thru his hands and met his approval; and was in the hands of the publishers when his death came, December 29, 1919. The "Foreword" of 15 pages, written by F. H. G., is largely an appreciation of the personality of Osler; but to some extent it is an interpretation of the mind of the physician, the attitude of thought that develops from his studies and his life. This collection suits the physician's psychology as well as any that has been made.

The verses have been gathered from wide sources, from Shakespeare and Ben Jonson to Rupert Brooke and Yeats. The writers most largely rep-

resented are Mathew Arnold, Emily Bronté, Robert Browning, Clough, Emerson, Lecky, Tennyson and Wordsworth. Physicians, including Bridges, Keats, Holmes and Weir Mitchell, have furnished some of the best work; and some of them, as Henry Head and W. S. Thayer, appear here in a role in which we had not before known them. The more than 300 poems, and excerpts from poems, here collected show wide reading and catholic taste on the part of the collectors. Many of the favorites of the older collections are here, but many are not to be found in any earlier anthology.

It is most inspiring to learn what such busy men have done in their leisure moments. It is pleasant to think of the Editor of the American Encyclopedia of Ophthalmology and the Editor of the Index Medicus, amid the rush and strenuous effort of war conditions finding relaxation in the discussion of the relative merits of candidates for place in this tribute to the earnest, kindly, sympathetic leader of the medical profession. The result of their conferences is worth having. It is a book that the busy physician can carry in his pocket, or pick up for a moment, long enough to read a verse that may stay with him half a day, a refuge from the complaints and fault findings amid which he has to work.

E. J.

CORRESPONDENCE.

Cataract Operations.

To the Editor: I was glad to see Dr. Ellett's letter in the March number of the JOURNAL, in which he commented on Dr. Vail's cataract article in the August, 1920, number of the Ohio State Medical Journal.

Time only strengthens my belief in the inadvisability of performing the Smith operation in this country. Social conditions in India have made it almost necessary to reduce a cataract operation to the briefest time possible; hence the evolution of the intracapsular operation. Enormous material has enabled Indian operators to acquire great skill, but lack of late statistics

has rather clouded judicial conclusions. Several conditions and necessities have rendered the intracapsular procedure the operation of election in India, but these environments are nonexistent here.

Here we may deliberate and conclude as to the really safest procedure, the one yielding the best percentage of good results, the one we would choose for *ourselves*. Because circumstances have dictated the wisest operation for India is no reason why this procedure should be forced upon America, where conditions are entirely different. Neither should we be unduly influenced by returning travelers like Green, Vail, Fisher, and others who, having been tutored and enthused in India by Smith and privileged to perform hundreds of operations under his skillful tutelage, desire to transplant the Smith operation into America.

Doubtless they possess considerable skill in their new operating venture, and they are certainly most enthusiastic and perhaps view with some impatience the unconvinced home ophthalmologists. But they must not be disquieted if their professional brethren fail to respond to their enthusiasm and eloquence, and they should remember that very few of us have had the advantage of an Indian journey and hundreds of personally conducted experiences into the mysteries of the intracapsular operation. We are but humble operators, doing perhaps 50 or 60 senile cataract operations a year and feeling a great sense of responsibility over each operation as it comes, a sincere desire to get the best possible result in each and every case, and unable to find an instance where experimentation seems justifiable.

Besides this, our patients stay with us; we see them or their friends from time to time; they are within reach of influences that may injure our reputation; they have access to law courts; they do not come and then go back into the distant hills of India to be heard of no more, blind or otherwise. Associated sentiments and interests, therefore, inspire us to tread the path of conservatism, to continue procedures that have

proven quite satisfactory, and to accumulate knowledge and perfect our technic as time passes and opportunities present themselves.

I do not condemn the Smith operation when performed in India, where it is almost a necessity—I do not even (*perhaps*) condemn it in America when performed by those who have received special instruction on many cases, but I *do* emphatically protest against it when attempted by *myself*, an average operator with no especial instructions and limited opportunities. Successful results following the Indian operation are brilliant and seductive and may easily and naturally lure the young and enthusiastic operator from the admonishments of conservatives. But I doubt if the general adoption of this extrahazardous procedure would yield as good average percentages as the older operations and I will further venture the belief that this would be true, *even*, with *experienced* American ophthalmologists. I believe that some day a conservative intracapsular operation will be proposed and adopted, but I am quite positive that the Smith Indian procedure will never be extensively used in this country. One feature of this operation I cordially endorse and use, viz., the retractors instead of the speculum; for, altho rather awkward to use, they certainly diminish the chance of escaping vitreous by *lifting the lids away from the eyeball*.

I have been greatly interested in the six points emphasized by Dr. Ellett as conducive to good results because, I suppose, they harmonize so fully with my own observations. They are as follows:

1. "Complete anesthesia." This is *most* important and after the incision is made, especially if an iridectomy is contemplated, I let a little of the anesthetic fluid pass into the anterior chamber and then remove the retractors and wait a short time for iridic anesthesia, as it very much lessens the tendency to ocular sensitiveness and motion, when the iris is pulled out and cut, thus lessening the danger of anterior chamber hemorrhage, which is always an embarrassing complication. I also cocaineize *both* eyes for it serves to increase the quiteness of the patient.

2. "Quiet in the operating room."

This dictum from a man of Dr. Ellett's excellent and tranquil personality is a great comfort to me. I acknowledge to the possession of a nervous disposition and I have always attributed to this personal defect my aversion to noise in the operating room during the performance of a cataract operation, which necessitates the condensation of much intense and concentrated mental anxiety and tenseness within the space of a very few moments. Hereafter I shall offer no apologies when I verbally and profanely object to the dropping of tin pans on the stone floor, the slamming of doors, the hum of conversation between internes and nurses or the loquaciousness of the patient.

3. "The patient should be told how to relax, etc." Many operations are spoiled by ignoring this suggestion. The patient should for the time being give himself over, body and soul, to the operation and yet many fight and resist and exhibit cowardice and thereby spell ocular ruin and destruction. A few reassuring and instructive words from the surgeon before and during the operation sometimes means ocular salvation; but the patient himself should relax, obey orders, and maintain absolute bodily and lingual quiet. Sometimes training the patient in looking up, down, in, and out for a few moments helps a good deal, and he should be told to keep his other eye open during the operation and to use it for fixation purposes.

4. "A large corneal incision is essential." Vitreous loss often follows a disregard of this rule. Nothing is more foolish than to endeavor to extract a large lens through a small incision; it simply invites disaster. This is also true of many traumatic cataracts, which are not always semiliquid by any manner of means. For this reason I prefer a Graefe knife and a capacious incision to a keratome and a small incision in many cases of traumatic cataract.

5. "A free capsulotomy." This is so evidently essential that it manifestly requires no argument and yet I have seen poor results follow a disregard of this rule.

6. "A careful toilet of the wound." This is essential. Every particle of lens

matter compatible with safety should be coaxed out of the eye. Many pupils look quite black after lens delivery, but show large amounts of opaque lens substance at the first dressing, on account of the nonremoval of lens fragments at the operation. Careful expression with spoons will remove much substance and this is much safer with the retractors than with the speculum. This procedure can be supplemented by washing out the anterior chamber with an irrigator. For this I prefer my own instrument, consisting of a gold end, shaped like a strabismus hook, with about a foot of rubber tubing attached to an air bag. This apparatus can be operated at the side, which is much better than using a pipette in the upper area of the eye under the brow. By thus operating, lenses, even tho not thoroly hard, can be effectually removed. The iris coloboma should be carefully stroked into place by manipulations on the surface of the cornea.

As a safety procedure I earnestly advocate a preliminary iridectomy, as it divides the attack on the eye and allows the cataract to be removed at the second operation, practically without anterior hemorrhage. I should certainly insist upon this precaution in my own personal case, if I had a cataract.

By observing these (and other) precautions, cataracts that are not thoroly ripe can, I believe, be removed with as much (and perhaps more) safety than with the Smith Indian operation; and it should never be forgotten that many ripe and mature cataracts never develop thoro peripheral opacity. In many cases, the fundus can still be seen quite well and if we waited until complete opacification occurred we would never operate at all.

FRANK ALLPORT.

Chicago, Ill.

TRAINING THE HANDS.

To the Editor: Dr. Rush's little article on "Training of the Hands" in the January number attracted my attention because of the importance of the subject and because of the uninteresting exercises he chooses to gain the desired object.

As he says, there must be mental and physical steadiness. The latter is the result of confidence in one's own knowledge of what he is doing.

Physical steadiness is the result of muscular strength and fine coordination of this strength. There are two amusements that gain all these ends in a most pleasant way, namely the game of tennis and target shooting with the 22-caliber target pistol. I have found nothing harder than to so coordinate all the muscles of the body, those of the outstretched arm, the trigger pull, with the eye holding the sight on a one inch bullseye at 20 yards. When one has learned this so that he can average 88 or 90 out of a possible 100 he need have no fear for his muscular steadiness.

I have also to disagree with him on the subject of size of hands. Mine, I fear, are unduly large but no one has ever accused me of unsteadiness; in fact, just the opposite. One of my confreres here when watching me do a cataract once said he wondered where I concealed the muscle necessary to hold *such* a hand so steady.

Physical weakness and coordination cannot exist together.

Very respectfully,

RODERIC O'CONNOR.

Oakland, California.

ABSTRACTS

Gallemaerts, E., and Kleefeld, G.
Microscopic Study of the Living Eye.
Annales d'Ocul. v. 157, 1920, p. 257.

This is the last of a series of papers published in earlier numbers (v. 156, p. 641; v. 157, p. 89, 129). The lens is first discussed. Special care is necessary in the focusing and in the adjustments.

Normal Lens. In an ectopic lens, the surface seems to be covered with small, brilliant prominences and excavations. In the latter are small, very delicate fibrils, arranged more or less concentrically. The mottled appearance is more pronounced at the center, less so towards the margins. The latter is perfectly smooth, and describes a perfect circle. Frequently the lens is covered with remnants of the pupillary membrane, which sometimes seems to be united to the capsule in a white point, which does not penetrate into the substance of the lens. At other times there is a thick fibrillary layer of grayish color covering the central part of the lens, often covered with small points which project into the anterior chamber.

When the lens is dislocated laterally, the insertion of the zonula is seen in the form of rigid filaments, like splinters of quartz.

The lenticular star is arranged as follows: The median branch is vertical and the other two are inserted at its inferior extremity, forming three angles. It is visible at every age. In each branch is seen a canal, optically empty and black, between two grayish tracts. There are neither nucleus nor fibers seen.

The posterior star is more complicated. It has three to four branches, often inserted at the same points. Sometimes there is a small horizontal line, at whose extremities the branches arise. Their tracts are sometimes rectilinear, sometimes sinuous. After running about 1 mm. they usually divide into two diverging branches. They are like the anterior branches, except that after dividing, there is only one grayish tract. The posterior capsule is dif-

ficult to examine but seems mottled like the anterior. Anomalies are frequent, on account of the fetal circulation.

Opacities are found very frequently in the normal lens, in the form of regularly distributed bluish gray points, but this varies. It is very difficult to differentiate these normal from pathologic opacities, unless they have been watched for a long time.

In the senile lens there is a considerable opalescence, the stars are much more distinct, and the fibers are less transparent. The nuclear part of the lens is distinctly more opaque than the periphery. In different places are areas of different refraction from the surrounding part, resembling bubbles of gas. The reflex from the anterior capsule is duller, and often there are raised areas, bullae filled with Morgagni's fluid.

Blue cataract is a misnomer. The spots are bluish, yellowish or grayish, sometimes club shaped, sometimes biscuit shaped, and they lie rather in the cortex than in the nucleus. Large numbers of microscopic crystals are found, with a greenish or reddish reflex.

Cataract. It is necessary, from a microscopic standpoint to differentiate congenital, senile, traumatic and complicated cataracts. The varieties of congenital cataract observed are zonular and polar, the latter being anterior and posterior fusiform, and in plaques. The zonular is seen as described by various authors, with the difference that almost the entire lens shows the opacities, which are rarer in the clear zones.

The question of the congenital or inflammatory origin of the anterior polar cataract is made more obscure. In all cases observed there were present brownish filaments which often extended towards the iris trabeculae. Sometimes these were very long and free in the anterior chamber, covered with debris of pigment cells, resembling remnants of pupillary membrane. The cataract itself is pyramidal in shape, with a slightly curved axis, and is so dense that no details can be made

out. The capsule shows a grayish, circumscribed elevation, much larger than the cataract, which is in relation to the filaments previously noted. Beneath this is a series of lamellar, very opaque areas of variable sizes, superimposed and joined by opacities which are suggested rather than seen.

The congenital and inflammatory posterior polar cataracts are almost identical in appearance. The congenital is a conical mass, extremely dense at its base and well outlined, while the inflammatory is almost star shaped and is less condensed. The plaque form lies in the middle of the lens. It frequently has a star shape, but usually has the form of a rosette, with the more opaque part at the periphery. It is composed of small white, almost mother-of-pearl points. Instead of a plaque, these may form a very delicate spherule.

The appearance of the lens in senile cataract corresponds to the classic description. The important thing is the condition of the anterior capsule, upon which depends the success of the operation. When the cataract is mature, the normal capsular reflex and the mottled appearance have disappeared. A very diffuse fibrillation appears, accompanied by small elevations formed by Morgagnian fluid. The lenticular opacification has a radial aspect, composed of small white points which form grayish or yellowish gray areas. The so-called Morgagnian cataracts show a sclerosed capsule, behind which is a grayish white, diffuse coloration.

Complicated cataracts vary with the calcareous content. Both capsule and cortex are usually intact. The lens substance is traversed irregularly by grayish, shining, translucent areas, resembling large crystals of alum, between which are spaces of a black appearance. This fibrillary arrangement would indicate a toxic, while that of the senile would indicate some other origin.

In traumatic cataract the ruptured capsule hangs in the anterior chamber, is transparent, rolled up and nonelastic. The contained lens is diffusely opaque, while frequently there are

found in the anterior chamber masses of shining transparent lens fibers. The usual appearance is that of a cobweb, with relatively thick, very brilliant radiations, united by many layers of delicate, brilliant tissue, sprinkled with cholesterin crystals. Frequently, posterior synechiae are found. It may show a hernia of the vitreous into the anterior chamber.

The vitreous. Only the anterior third can be examined, and that is difficult. After suitable preparation, a bluish haze can be seen behind the lens, which is the vitreous. This has a wavelike movement when the eye moves. Then a whitish, sinuous filament can be seen. The postlenticular space has the thickness of the cornea. The anterior limiting zone is traversed anteroposteriorly by fibers of varying numbers, and this zone does not move. The vitreous proper is composed of a framework, bathed in fluid, of a network of fibers of variable thickness and shape.

The opacities caused by the inflammation in the region of the choroid are rarely visible by the microscope. The vitreous may, however, show alterations consisting of deposits: (a) red or white globules, (b) pigment cells, (c) crystals of hematoidin or cholesterol, (d) fibrin. The elements of the vitreous itself may be altered in the direction of rarefaction or of increase.

In synchysis scintillans there are present small ovoid yellowish white, or iris colored bodies, especially numerous in the periphery, and with limited movement. However, when the eye is moved, they are set in motion and give the scintillating effect.

In hernia of the vitreous there is a network of whitish filaments, of varying thicknesses, with a yellowish spot at the intersections. These hernias partake of every ocular movement.

C. L.

Weisfelt, W. A., *Influence of the Heterophoria on the Amplitude of Accommodation*. Doctorate thesis. Utrecht, 1919.

Weisfelt has investigated the influence of the position of rest of the vis-

ual lines on the amplitude of accommodation. One can imagine that the extra strong convergence with exophoria and the lessened convergence with esophoria can have an inciting or retarding influence on the innervation of the ciliary muscle, which is one of the two factors that regulate the amplitude of the accommodation. It was necessary to investigate once more this amplitude, especially for younger subjects. The vision must be 5/5 with or without correction.

The determination of the refraction gives us the punctum remotum. The simplest way for determining the punctum proximum is to bring an object slowly towards the eyes and to measure the smallest distance at which it can be still seen clearly. Weisfelt has used a dull dead black cover of a cylindrical tube of the size of a silver dollar, which has a rectangular opening 3 cm. long, 1 cm. broad, in which could be placed strips of paper on which were printed small letters of Snellen ($D = 0.5$) or numbers. During reading the tube is brought towards the eyes until the patient begins to hesitate, which indicates that the near point is reached or approached. This important indication is absent with Duane's object. With a tape the distance from the cornea is measured. The determinations must be repeated until values are found which do not differ more than one-half centimeter. Numbers are preferred, as they miss suggestive readings. The experiments were done during the summer months in the middle of the day. Practical reasons allowed only determination of the total hyperopia in a limited number of cases. The heterophoria was determined with the Maddox rod before the right eye and measured with prisms. The younger individuals were normal as to ocular conditions.

No appreciable difference in amplitude of accommodation was found between the right and left eyes. Exceptionally the difference was 0.5 D. The highest and lowest values compared give not a larger difference than 3 D. The average amplitude of accommodation after the 15th year differs only

slightly from that of Clarke. Graphical demonstration shows that beneath the 20th year, Weisfelt line runs between that of Donders and Duane, above this age it remains permanently above the one of Duane, with a meeting at the ages of 40 and 45.

Weisfelt found 8 persons with esophoria greater than 2° , esoph. 2° and 1° in 19, orthophoria in 19, exophoria 1° and 2° in 18, and exophoria greater than 2° in 13. The eso- and exophoria did not seem to have any influence on the monocular amplitude of accommodation. In many cases of exophoria larger than two prism degrees the binocular amplitude was larger than the monocular, probably under influence of the strong convergence on the innervation of the ciliary muscle. In the lower cases of exophoria and with esophoria no difference could be detected between the amplitude for both eyes taken together and for each eye separately. Heterophoria, as such, does not necessarily give rise to complaints of headache or asthenopia. It is the expression of a balancing around an average.

Graphs and a complete list of all the examined cases accompany the thesis.

E. E. B.

Junius. Vernal Conjunctivitis. Archiv für Augenheilkunde. LXXXVII. Bd. Heft 1-2. (1920.)

The clinical picture of socalled spring catarrh of the eye is well known, but its cause has as yet not been ascertained. Junius has conducted experiments and brought together the literature, seemingly showing that certain changes in the blood, more particularly in the production of porphyrin, together with the photochemical effects of light, cause vernal conjunctivitis.

The characteristics and course of the disease are peculiar. Its causes can only be in two possibilities; either the irritation of the light or its effect, causing a change in the metabolism of the tissue, or a parasitic influence, the latter of which has never been shown. The effect of light rays cannot be its sole cause, although clinical observa-

tions show this to be of considerable influence. Clinical observations and pathologic anatomy show the following:

1. The disease is not a catarrh in the ordinary sense, as it is not usually accompanied by free secretion of eosinophile leucocytes, even when there is a little tenacious secretion. There is a whitish color of the membrane, as if plaster had been strewn over it. The tubercles or granulations exist on the tarsal surface of the lids and also on the circumcorneal ring, but the portion of the conjunctiva exposed by the aperture of the lids is not affected and the cornea always remains clear.

2. The disease is always bilateral. The circumcorneal ring is affected, but corneal ulceration only occurs by reason of trauma. The process is the same in the lids as it is at the edges of the cornea.

3. The disease occurs chiefly in children and young people, usually under 20 years of age without other general complications or diseases, and it begins in the spring.

4. The symptoms increase in summer and ameliorate in the fall. Many patients are well all winter, but have the disease intensely the next spring, and it goes on for years. Cicatrices never form.

5. Treatment does not cure. Operations are of little effect—the disease recurs. Symptomatic treatment brings some relief. Protection glasses and collyria are of benefit. The lid commissure is not affected, so we must look further for the cause than the results of light. The parasitic cause is not to be lost track of, as the histologic picture is like that of rhinoscleroma with hyalin sclerosis, and in other trophic diseases there is a more or less well defined parasitic etiology.

The following unanswered questions have not yet been solved:

1. Why is the disease limited to young persons who have not yet reached full development, who are usually better protected from the effects of sunlight than many of older years?

2. Why does the disease disappear in other surroundings and even in the

same environment, spontaneously, without cicatrices, before the beginning of old age?

3. How can we reconcile the observations that the patient has a pasty look and enlarged glands about the head, which do not often occur in the neck, as they do in scrofula and tuberculosis, but are found in other parts of the head?

4. Why is it that eosinophilia is found in the tissues and seldom seen in the blood of the general circulation?

v. Tappeiner and Raab seems to show that chlorophyll eosin and other fluorescent chemical substances have some influence in sensitizing. Meyer-Betz shows that increased hematoporphyrin kills paramecia in the light and takes the coloring out of the red blood corpuscles. Injection experiments in warm blood animals of this substance show that when they are kept in the dark they remain alive and healthy, but when brought into the sun these animals have photophobia and become diseased and die. The experiments of Meyer-Betz also show that increase of hematoporphyrin causes an increase in the sensibility of the skin.

Does this or another derivative of the blood give rise to an etiologic factor in the production of conjunctivitis vernalis? A number of case histories and experiments are cited, showing that pathologic increase of hematoporphyrin in the body has an influence in causing severe disease or irritability of the skin, in a sense of the photo-dynamic effect of light, especially in hydroa vacciniform and like conditions; also in hematoporphyria acute, toxic and chronic.

Hematoporphyrin is produced from the hematin of the blood, which is an acid connecting with hemochromogen, the second component of the coloring matter of the blood, hemoglobin. In the destruction of chlorophyll, the coloring matter of plants, phyllerin and porphyrin are produced thru oxidation, and a similar destruction in the blood produces hematin and its derivatives. Hematoporphyrin exists in impoverished blood and causes changes in the skin and conjunctivitis. There is a pre-

dilection in the overlying capillaries of the circumcorneal area and in the tarsal conjunctiva, over the cartilages, for changes due to hematoporphyrin.

Injection experiments of the chemical constituents of the coloring matter of the blood show the following: Hematoporphyrin has a strong effect in causing intense sensitization of the tissues to the effect of light. Mesoporphyrin, which is in close relation with hematoporphyrin, has little effect. Porphyrinogen causes intensive sensitization. The hitherto unknown constituent, porphyrin, causes intense sensitization and it is thought that porphyrin, with the photodynamic effect of light, plays a role in the production of vernal conjunctivitis.

H. V. W.

Fuchs, E. Proliferation of the Ciliary Epithelium on the Lens. Klin. M. f. Augenh., v. 64, January, 1920, p. 1, illustrated.

Fuchs gives the anatomic description of a congenitally myopic eye of a boy, aged 11, with other congenital anomalies, viz., ectopia of the lens, abnormal shape of the ciliary processes and remnants of the hyaloid artery. It had sustained 2 injuries within 3 months; a small perforation of the cornea without infection, and a contusion causing dislocation of the lens, hemorrhages of the vitreous and subretinal space, rupture and detachment of the retina, with subsequent hypertension, degeneration of the retina, and proliferation of the ciliary epithelium.

This proliferation started from the tear of the pars ciliaris and spread forward over the whole iris and a portion of the posterior surface of the cornea, and backwards on the largest part of the lens. Here it was intensely pigmented, imparting to the lens a black aspect from in front, similar to the "pigmented secondary cataract," described by Brückner. The proliferation of the ciliary epithelium is rather frequent in hypertension of long standing, especially in ectatic eyes. Fuchs published this case of pigment covering of the lens, as Brückner could not find a similar case in literature.

C. Z.

Lindner, K. Metastatic Ophthalmia, with Striped Corneal Opacities. Klin. M. f., Augenh., March-April, 1920, p. 217.

A Russian prisoner was brought into the hospital for a gunshot fracture of the right knee with gas phlegmon and general symptoms of sepsis. After two days the thigh was amputated. A week later he could not see out of his left eye, the cornea of which had become opaque. He died after two days. His eye was enucleated four hours later. The capillaries of the marginal vascular loop of the cornea, the anterior ciliary veins and the canal of Schlemm were filled with streptococci. There were also thin tracts of streptococci between the posterior lamellae of the cornea, in the nucleus of the anterior chamber and the insertion of the ciliary muscle, in the iris and the plane part of the ciliary body, along a posterior ciliary nerve into Tenon's capsule and in the suprachoroidal space. Except a few chains at the border towards the posterior chamber, the vitreous contained no streptococci, nor did the vascular system of the uvea and retina. The cellular elements of cornea and sclera and the whole tissue of the iris were necrotic.

There was only moderate leucocytic infiltration in the episcleral tissue. This lack of defensive reaction is explained by the last stages of septicemia, in which the ocular affection occurred. The center of the cornea was thickened by swelling of the necrotic tissue. The peculiar formation of stripes in the opaque cornea is attributed to the optical effect caused by the entrance of aqueous in the cornea thru the necrotic endothelium.

C. Z.

Staicovici, N. and Lobel, A. Treatment of Trachoma During the War. Arch. d'Ophtalmologie, Vol. XXXVII, No. 11, November, 1920, p. 689-699.

The authors' report on the treatment of 12,000 cases is interesting, not alone on account of the large number of cases considered, but also because it concerns cases of a few days standing up to cases which had been treated in the regimental hospitals twenty years

previously. The first feature worthy of note was the predominance of the gelatinous, friable granulations. The follicular form was seldom seen, due, as the authors think, to the fact that these milder forms are seen and treated early.

The authors uphold the existence of an acute form of granular conjunctivitis; and look for corroboration to Morax, who observed several cases in Egypt presenting the acute symptoms. These he interpreted as mild infections added to old-standing cases of trachoma. In such cases the swelling of the lids and conjunctiva may assume such proportions as to suggest purulent ophthalmia, but the profuse secretion of gonorrhreal ophthalmia is lacking. As this condition may last for weeks, corneal and other serious complications may add themselves to the original pathology. When, however, a patient comes with the history of having suffered for a few days only, and has one eye only affected, the other being perfectly sound, as the authors saw in the person of one of their male nurses, no doubt as to the existence of a primary acute granular conjunctivitis can exist.

After passing in review the numerous surgical procedures the authors state their decided preference for curettage. But even this procedure was found wanting in many cases, in which the papillae were indurated to such a degree that the curette removed the surface only, and the patient left the operating table with his lids almost as thick as before the operation. This made them seek a means of removing the diseased conjunctiva in its entirety, and this desideratum was found in cube sugar which had been sterilized in alcohol. The rough surface of the sugar removes the conjunctiva in a uniformly regular way down to the tarsus much better than the curette. It showed the superiority also in cases in which there was a recurrence after treatment with the curette.

The manner of procedure is: after disinfection and anesthesia with cocaine instilled and injected under the conjunctiva, the lid is turned over as far

as possible on a hard rubber lid plate, where it is held under tension with a double hook inserted close to the margin of the lid. Holding this hook in his hand the operator puts traction on the conjunctiva so as to draw it out of the fornix and immobilize it against the rubber plate. Holding the cube of sugar in his right hand the operator rubs lightly over the conjunctival surface from one side to the other, beginning in the fornix and ending at the lid margin. The treatment concludes with the conjunctiva in the canthi, which demand special care, as this is the most difficult place to get to. In the more rebellious cases a more energetic rubbing is called for. The operation may be considered complete when a smooth, milky-looking surface comes to view thruout. The lower lid is treated in the same way.

To conclude the eye is washed with a 1/5,000 solution of oxycyanid of mercury. Both eyes are operated at one sitting, the cocaine anesthesia making it possible, inasmuch as the pain is far less than that caused by curettage. The eyes are bathed twice a day with the oxycyanid solution just mentioned, and a 3% solution of protargol instilled. About five days later the swelling of the lids has disappeared, and the false membrane has begun to detach itself from the abraded surface. The gradual cicatrization is aided by cauterisation with 2% silver nitrat or sulphat of copper (which seems to have a specific action) practised twice a week.

A point of great importance in this procedure is the following: when the lid has been reversed and the cocaine injected, so that the fornix is brought into plain view it can be seen that the pathologic process stops at a line of demarcation in the fornix, and that from this line up to the limbus, the bulbar conjunctiva is absolutely healthy. It is of greatest importance that we respect this healthy conjunctiva, for it is from this healthy conjunctiva in the fornix that the repair material comes, and is gradually drawn towards the lid margin. The more abundant this repair material the

better will the lid retain its form and suppleness.

Amongst the cases observed were some which had been operated on by other methods many years before, which showed a perfect cicatrization of the palpebral conjunctiva with a pearl white color, in which, however, there were serious corneal complications, such as vascularised pannus and ulcers, even to the perforating kind. The authors explain this by saying that the continued friction of a hard tissue, such as the scar tissue replacing a totally destroyed conjunctiva, deprives the cornea of the protection of a supple and moist covering such as nature intended it should have in the normal conjunctiva.

To obtain the disappearance of the neformations and to prevent the transformation of the palpebral conjunctiva into cicatricial tissue which might endanger the cornea by the close contact with an indurated tissue, as well as by the secondary deformities of the lids, the authors have resorted to massage, or rather to friction of the conjunctiva to promote the resorption of the adenoid tissue. Cocain anesthesia having been produced and the lid having been turned over on a Desmarres clamp, 50 or 60 frictions are made with the tip of the little finger, carrying an ointment of 30% sulphat of copper. The lower lids receive the same treatment, and the eye is then washed with a jet of water. A mild tumefaction of several hours' duration ensues. The friction is repeated on the third day. In the numerous cases in which this treatment was used, results were obtained in some which deserve the word "marvelous." When both eyes are affected the treatment should be given to each eye on alternate days.

Amongst the complications of trachoma none is more feared by both patient and physician than the corneal ulcers which may appear at any stage of the disease. In more than 400 cases the authors found the sovereign remedy to be the immediate injection under the conjunctiva a mixture of one-half ccm. of 10% dionin and one-half

ccm. of 1/3,000 cyanid of mercury. An intense local reaction ensues, but an hour later the patients are happy, all pain having disappeared. Both the formula for the injection and the idea of injecting at the earliest moment, instead of first trying out all kinds of drops and ointments, are new. In most cases the ulcers were aborted with three injections made at intervals of three days; in some cases one injection sufficed. At the same time a probable pannus was headed off. To be sure, in some cases of severe ulcers recourse to conjunctival autoplasty became necessary.

In chronic vascularised pannus the authors employed peritomy modified in the following manner: The conjunctiva was detached at the corneoscleral margin over half of the circumference of the cornea and dissected back with scissors and bistoury for at least three millimeters. With a lump of sugar disinfected in alcohol the uncovered area was rasped until all tissues down to the white sclera had been removed. In this manner a complete interruption of the circulation is obtained, a cicatricial band results, and the pannus recedes.

The authors reproach most of the methods for the relief of entropion and trichiasis with their inability to prevent recurrences, or the ugly deformities produced without compensating relief. The only method which meets their approval is that of Kuhnt, by which the underlying cause is removed, and the levator advanced and strengthened so that the palpebral opening is enlarged. The entropion of the lower lid is best corrected by the method of Panas, modified to this extent that the cartilage is split from one end to the other, which allows an easier turning outward of the margin. They have also corrected the entropion of the lower lid according to Boucheron by extirpating the tarsus, and according to the easy and quick method of Thilliez: vertical cauterisations of the tumefied conjunctiva followed by median blepharorraphy, which is maintained for a fortnight.

The lacrimal apparatus should always be inspected, and in most of the cases of some duration the canal will be found obstructed. Fukala thinks the greater resistance of negroes to trachomatous infection is due to the greater patency of the lacrimal canal.

M. W. F.

Guillery, H. Tuberculosis and Sympathetic Ophthalmia. Arch.f. Augenh., v. 86, Heft 1-2.

Guillery gives a review of the literature on the similarity of the anatomic findings in sympathetic ophthalmia and tuberculosis. He shows the discrepancies of interpretation on account of the repeatedly emphasized difficulties, the frequent failure of inoculation and the finding of bacilli. For facilitating the bacteriologic diagnosis, Guillery emphasizes the accumulation method after treating the tissues with antiformin, which yielded such good results in examination of sputum.

The eyeballs were fixed in formalin or sublimat, and after washing and treatment with iodin in alcohol, hardened in alcohol up to 96%. Then the eyeball was sagitally cut in half. The uvea of one-half was cut in smaller pieces, placed in 15% antiformin solution, and put into an incubator. After about 5 hours everything was dissolved. The centrifugate was transferred to a slide, fixed over a flame and stained according to Ziehl-Neelsin, or partly according to Much. The other half was used for histologic examination. Thus Guillery examined various tubercular organs of man and animals, and found in almost all cases without difficulty the bacilli, but not always in great number.

The histologic examination of an eye enucleated on account of chronic iridocyclitis, phthisis, with nodules in both irides, showed in several hundred sections no typical tubercular foci; but the antiformin method rendered the bacteriologic diagnosis probable. In the eye of a child who had died from general miliary tuberculosis, the choroid presented anatomically nodules of typically tubercular structure, many

giant cells and partial tyrosis, but no tubercle bacilli. The centrifugate showed all over on the slide easily detectable bacilli.

In order to prove the method further Guillery inoculated rabbits thru the intravenous injection of tubercle bacilli. Anatomically, infiltration of the iris with lymphocytes, diffuse and in small foci, was ascertained; and in the choroid small foci of round and epithelioid cells, no giant cells. The other half of the eye treated with antiformin regularly exhibited bacilli. Guillery recommends his method in uveitis of unknown origin. The eyes must not be treated with Mueller's fluid, which inhibits the staining of tubercle bacilli. The result probably will be that the border lines of ocular tuberculosis must be further advanced. C. Z.

Szily, A.v., Senior. The Blind Spot as a Means of Exposing Simulation of Unilateral Blindness. Klin. M. f. Augenh. v.65, p.1.

Three equidistant horizontal round marks the size of a dollar are placed on a vertical wall. If one fixes at a proper distance the central mark, the image of the right mark falls upon the right optic disc and that of the left upon the left optic disc. However, all three marks are seen simultaneously, because the images of the two lateral marks are thrown laterally on the macula in the contralateral eyes.

The person to be examined is placed opposite the central mark, with a sufficiently large screen held between his eyes in the median plane and is ordered to fix the central mark. If his distance from the wall is not so that the retinal images of the lateral mark do not fall upon the blind spots he sees, (if he is not blind in one eye) the right mark with the right eye, the left mark with the left eye. If he is blind in one eye he does not see the mark of the corresponding side. The malingerer asserts the same.

He is now asked to approach the wall until he sees only the central fixated mark (which occurs if the images of the lateral mark impinge on the optic disc of each eye), and to remove

the median screen. If he sees in both eyes he will at once see also the lateral mark. If he is blind in one eye he sees only two marks, besides the central a lateral one; but not as before the one on the side of the seeing, but on the side of the blind eye; because the image of the homolateral mark falls upon the blind spot, and only the image of the contralateral mark upon a seeing place of the retina. The malingerer whose attention is by no sensation directed to the behavior of the three marks visible to him, without exception insists on his former assertion; and denies as before that he sees the mark on the side of the blind eye. However, he must be prevented from closing one eye, by which he might gain correct orientation. C. Z.

Elewaut. Hemianopsia from Occipital Wound. Archives Médicales Belges, September, 1920.

The author reports three cases of homonymous lateral hemianopsia following gunshot wounds of war. In the first case a fragment of shell struck in the right occipital region. There was prolonged coma, typical lateral homonymous hemianopsia, and conservation of the macular vision. The visual acuity was very poor, considering that the eye was emmetropic and presented no lesion. But this diminution of visual acuity was due to meningitis, having affected the cells of the occipital visual center.

In the second case typical lateral homonymous hemianopsia, loss of the left field, had followed a wound of the right occipital region by a rifle bullet.

The third case was one of right inferior quadrant anopsia which followed injury by a fragment of shell striking the left parieto-occipital region. DANIS.

Uhthoff, C. A.: Four Cases of Subretinal Cysticercus in Soldiers. Klin. M. f. Augenh., v.64, February-March, 1920, p. 120.

In consequence of irregular or suspended meat inspection during the

war, observations of cases of cysticercus became more frequent. In the first case of Uhthoff vision arose after extraction, from counting fingers at 30 cm. to 1.50 m. In the second case perception of light was preserved. The third case was complicated by an adherent thick capsule within a subretinal hemorrhage. Repeated introductions of the loop finally brought out the cysticercus with considerable loss of vitreous.

Incapsulations of long standing have been observed in enucleated eyes, but are rare at such early stages. The attempted treatment with iodid of potassium, neosalvarsan, and benzol was of no avail, in accordance with the experience of A. von Graefe. The visual disturbance, especially at the macula, is supposed to set in, at the earliest, two months after immigration. This question was important for granting war indemnity in this case. In the fourth case the cysticercus was near the nasal border of the disc. As the eye was without irritation and V=6/12, the operation was postponed.

C. Z.

Angelucci, A. Style in Painting. Archivio di Ottalmologia, XXVII, March-April, 1920, p.1.

Here the scientist, in a moment of relaxation, is evidently pursuing a favorite subject. He traces the development of style in modern painting from the early Christian drawings in the catacombs thru the Renaissance, to the realists, impressionists, synthetists, cubists, and ultramodern futurists.

What will interest ophthalmologists most is his account of Leonardo da Vinci's conceptions, phenomenally acute for his time, of many visual laws. He knew and wrote about the effects of binocular vision, the rules of perspective, complimentary colors, and the law of simultaneous contrast. The author shows the immense effect of this knowledge on his work and that of his successors. A bibliography of seven titles is included. S. R. G.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS.

Dr. J. Rohmer, Professor of Ophthalmology at the University of Nancy, died recently.

PERSONALS.

Dr. Hansell, of Philadelphia, will leave for Europe in June to remain abroad for three months.

Dr. Walter K. Seelye, of Seattle, announces that Dr. S. D. Maiden is now associated with him in practice.

Dr. Hiram J. Smith has resigned as Superintendent of the Illinois Charitable Eye and Ear Infirmary.

Dr. Alexander S. Rochester, of Los Angeles, formerly of Chicago, was married on March first, to Miss Olive Margaret Redford, of San Francisco.

Dr. J. Gonin has been appointed Professor of Clinical Ophthalmology in the University of Lausanne, succeeding the late Professor Eperon.

Dr. George F. Keiper, of LaFayette, Ind., suffered considerable loss when his car was burned in a fire in the garage in which it was stored.

At the annual meeting of the Lincoln Paper Mills, Merritton, Dr. Thomas A. Woodruff, formerly of Chicago, was elected Vice-President and Manager of the company.

Governor Morrison, of North Carolina, has appointed Dr. Wiley A. Rogers, of Macon County, to serve for six years on the governing board of the State School for the Blind at Raleigh.

Dr. David A. Strickler, of Denver, was elected Vice-President of the Federation of State Medical Boards of the United States at its annual meeting held in Chicago, March eighth.

The March tenth meeting of the Buffalo Ophthalmological Club was addressed by Dr. H. Gradle, of Chicago. The subject chosen by Dr. Gradle was "Recent Advances in Ocular Therapeutics."

Dr. Bryed Wilson of Chicago is to sever his business connection with Dr. Frank Allport, with whom he has been associated for the past three years, and on May first will open an office in the Peoples Trust and Savings Bank Building, Chicago.

Dr. Burton Chance, of Philadelphia, was the guest of the Section on Ophthalmology of the Medical Society of the District of Columbia, in Washington, on Friday, February fourth, when he delivered an address on "Some English Worthies of Science of Interest to Ophthalmologists."

Dr. Robert Scott Lamb, of Washington, D. C., will read a paper by invitation before the Ophthalmic Section of the College of Physicians of Philadelphia on Thursday evening, April the seventeenth, on "Operative Treatment of the Detachment of the Retina."

Dr. Nelson M. Black, from Milwaukee, addressed the Medical Section of the Academy of Medicine at Buffalo, New York, on March ninth. The title of his paper was "Ocular Findings in Head Injuries, Especially in Regard to the War." A complimentary dinner was given in Dr. Black's honor.

Dr. Thomas H. Fenton, of Philadelphia, who was held up and shot within a short distance of his home, in January, is recovering after a radical mastoid operation rendered necessary by the shattered condition of the bone which followed the shot. Dr. Fenton has had the sincere sympathy of his wide circle of friends, both in and out of ophthalmologic circles.

Dr. Harold Gifford, of Omaha, has been doing work in comparative ophthalmology with Dr. Casey Wood at the Tropical Research Station, British Guiana. Dr. Gifford is a well informed zoologist, and has found plenty to occupy himself, in company with the Director, William Beebe, with the flora and fauna of the South American jungle. He intends to visit the celebrated Kaiteur Falls, more wonderful than Niagara, some one hundred and fifty miles in the interior of British Guiana.

SOCIETIES.

The next Annual Congress of the Ophthalmological Society of the United Kingdom will be held on the fifth, sixth, and seventh of May next, at the Royal Society of Medicine, London.

The Oxford Congress will convene at Keble College, July 6, 7, and 8. Dr. V. Morax, of Paris, will deliver on the 7th, a lecture on the "Causes of Infection after Cataract Extraction," and on July 8th Dr. E. E. Maddox will deliver the Doyne Lecture on "Heterophoria."

At the regular meeting of the Chicago Ophthalmological Society, March 21, 1921, papers were read by Dr. H. S. Gradle on "The Blind Spot," and by Dr. R. H. Good on "A Simplified Intranasal Operation for Stricture of the Nasal Lacrimal Duct.

The members of the General Committee of the International Congress of Ophthalmology, representing the American Ophthalmological Society, the Ophthalmic Section of the American Medical Association and the American Academy of Ophthalmology and Oto-Laryngology, met in Philadelphia at the office of Dr. George E. de Schweinitz, on Tuesday, February twenty-second.

The Ophthalmic Section of the College of Physicians of Philadelphia at its meeting in January reelected Dr. G. Oram Ring, Chairman; and elected Dr. Charles R. Heed, Secretary, to succeed Dr. J. Milton Griscom, the latter having served the Section as Secretary for four years.

The President of the College of Physicians, of Philadelphia, Dr. William J. Taylor, appointed the following executive committee to serve the Ophthalmic Section for the year 1921: Drs. Howard Forde Hansell, William T. Shoemaker, and George E. de Schweinitz.

At the seventy-fifth annual meeting of the Ohio State Medical Association to be held at Columbus, May third to fifth, Lieut.-Col. Henry Smith, India, will deliver a special address before the eye, ear, nose and throat section on "Ophthalmology," and he will also hold an eye clinic at one of the hospitals on the second day of the meeting.

Louisville has an eye and ear society that has been in existence for the past six or seven years, and now that things are becoming normal again is in a flourishing condition. The annual meeting was held in January and the guest of honor was Dr. J. A. Stucky, President-elect of the State Medical Association. A state eye and ear society is to be organized, to hold a meeting once a year on the day previous to the opening session of the Kentucky State Medical Association.

The International Congress of Ophthalmology, to be held under the auspices of the American Ophthalmological Society, the American Academy of Ophthalmology and Oto-Laryngology and Fellows of the Section on Ophthalmology of the American Medical Association, is a congress independent of and in no way affiliated with the International Congress of Ophthalmology which has convened from time to time in the past, the last session of which was to have taken place in St. Petersburg in 1914. The dates for the present International Congress to be held at Washington, D. C., have been changed from April 18-21, 1922, as previously announced, to April 25-28, 1922.

At the meeting of the Sioux City Valley Eye and Ear Academy at its sixteenth semi-annual session, January 19, 1921, at Sioux City, Iowa, papers bearing on the eye were read by Dr. S. R. Gifford, Omaha, on the "Meibomian Gland as a Factor in Chronic

Blepharo-conjunctivitis; T. R. Gittens, "Congenital Glaucoma"; J. M. Banister, Omaha, "Squint, Concomitant and Paralytic, Surgical Treatment"; W. P. Wherry, "Possibilities of the Intensive Post-graduate Course as Established by the American Academy of Ophthalmology and Oto-Laryngology"; W. L. Benedict, Rochester, Minn., "Retinal Changes of the Kidneys and Cardio-vascular System"; and H. S. Gradle on the "Use of Some Recent Ophthalmic Therapeutic Preparations.

At the meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, March 17, 1921, papers were read by Dr. J. Parsons Schaeffer on the "Modern Conception of the Anatomy of the Naso-Lacrimal Passageways in Man," with lantern and specimen exhibition. The discussion was opened by Dr. Sydney Yankauer, New York, followed by Drs. Wm. Zentmayer and Thomas B. Holloway, of Philadelphia. Dr. William Zentmayer read a paper on "Maxwell Operation on both Superior and Inferior Cul-de-Sacs"; Dr. J. H. Dewey, on "A Device for Spectacles for Infants"; Dr. Hunter W. Scarlett, on "A Suspected Foreign Body in the Posterior Chamber, seen thru a Slit in the Iris, but not Shown by X-ray and a Cilium Lodged in the Pupillary Space"; and by Dr. Burton Chance, on "Bilateral Congenital Ptosis with Inability to Look Up."

The Ophthalmological Society of Vienna announces an extraordinary meeting to be held August 4-6, 1921. Professor Meller announces that Thursday, August 4th, at 9 a. m., there will be a scientific meeting for the discussion on "The Success of the Latest Operations for Glaucoma Compared with the Classical von Graefe Iridectomy. Drs. Uthhoff and Wessely are to read the preliminary papers; the former on the clinical part and the latter on the theoretic and anatomic part. Gentlemen who wish to join in the discussion are kindly requested to inform the secretary, Dr. Lauber, in writing. At 3 p. m., there will be a demonstrative meeting. Friday, August 5th, at 9 a. m., a scientific meeting; 3 p. m., a scientific meeting; and on Saturday, August 6th, at 9 a. m., the last scientific meeting.

The place for the meetings will be announced in due time. A projecting apparatus and a sufficient number of microscopes will be at the disposal of visitors. Gentlemen are kindly requested to notify the Secretary of the extraordinary meeting, Dr. M. Lauber, Alserstrasse 25, Vienna VIII, of the papers which they intend to read or to discuss, as well as the demonstrations. This should be done before June 15th, as otherwise it will be impossible to include them in the program. The time allowed for the reading of the paper shall be fifteen minutes, for a demonstration five minutes. The contents of the papers must not have been published previously. The originals of the papers and the remarks on the discussions, including the proofs of plain sketches, have to be handed over, ready for printing, to the Secretary before the close of the meeting.

The charges for attending the meeting are 20 Marks for non-Austrian visitors, which amount should be sent before June 15th to the Rheinische Kreditbank, Filiale Heidelberg: Konto Prof. Dr. J. Meller. Reports of the meeting can be had from the publishers, who will allow 20% reduction to members attending the congress.

As it is very difficult to find lodgings, it is of the utmost importance that intending visitors should inform Dr. R. Krämer, Kochgasse 25, Vienna VIII, as early as possible of their coming, stating at the same time whether single or double bedrooms are required. Dr. Krämer will be glad to give any information about lodging.

MISCELLANEOUS.

The New York Eye and Ear Infirmary is to receive a bequest by the will of Mrs. Mary Helen Finch, New Brighton, Long Island.

It is announced that the Massachusetts Charitable Eye and Ear Infirmary will receive a donation from the estate of Joseph Thompson, of Boston.

A verdict of \$30,000 damages was returned recently in the Circuit Court of Chicago, in favor of the plaintiff, who was made blind by drinking wood alcohol.

At the last quarterly meeting of the Royal College of Surgeons of England, a committee was appointed to consider the question of establishing additional examinations in ophthalmology and in oto-rhino-laryngology for candidates who desire to take them after having passed the examination for the Fellowship.

A school for children infected with trachoma has just been opened at Tucumán. This school is an outcome of a suggestion made at the scientific congress held in that city in 1916. It is expected that other schools of a similar character will be organized in other Argentine cities where trachoma prevails.

The eyesight conservation council, of which L. W. Wallace of New York City is president, is initiating a nation-wide campaign to acquaint the public with the importance of eye care and to urge universal examinations of school children, industrial workers and clerks in offices and stores. The organization invites the cooperation of all existing agencies concerned in any degree with the movement for better vision, particularly the ophthalmologists of the country.

The Department of Health of the City of New York, at its meeting, January 27th, adopted resolutions amending the sanitary code dealing with the reporting of communicable diseases. The new list of diseases that must be reported to the department within twenty-four hours from the time diagnosis is made includes suppurative conjunctivitis, and trachoma.

In the last issue of the *Archivos del Hospital Rosales*, Dr. Luis O. Arévalo of San Salvador comments on the prevalence of trachoma at El Salvador in recent years. Among 4,513 individuals examined at random in the

National Guard, penitentiaries and public schools, only one was found infected with trachoma, altho many suspicious cases were found which later proved to be follicular conjunctivitis. During the last eight years twenty-two trachoma patients have been treated at the Hospital Rosales, the number of patients having increased in the last three years. Trachoma was apparently introduced in Salvador by Syrian or Turkish immigrants. In an examination made by Drs. Arévalo, Fáiley and Peralta of eighty-four Syrians at San Salvador, four were found infected by trachoma and one suspected case. Dr. Arévalo has, in addition, treated eight cases, three of them in a single family. Dr. Arévalo urges enforcement of immigration laws on the exclusion of trachoma patients, the training of examining physicians in the diagnosis of this disease, the compulsory reporting of trachoma, and public lectures on this subject.

The Medical Press and Circular for February 23d publishes the following:

A German Appeal to British Ophthalmologists.

OPHTHALMOLOGISTS in this country have received a communication from a German firm in Frieburg, soliciting orders for repairs to eye instruments. The opening paragraph reads, "with these lines J (*sic*) beg to inform you that J (*sic*) have just published a catalogue of 224 pages containing all instruments, appliances, furniture (*sic*), etc., which are used by the eye specialist." A quotation concerning the catalogue from "Landolt" (see A. J. O. p. 143) is added: "J thank you for sending me your beautiful and rich catalogue, the perusal of it enjoyed my professional heart." The date of this recommendation would be interesting, but it has been omitted. Further, we read: "J would be glad if you would use the enclosed postcard to ask for the sending of it [? the catalogue] free of charge." A speciality of this firm, is mentioned, that of sharpening eye instruments, "so that J can furnish you with workmanship which will give you complete satisfaction," and the hope is expressed "that you will favour me with your esteemed commands for repairs as well as for new good." This appeal sounds so loudly for itself, that any attempt at criticism would be lost in the din.

The New York Post-Graduate Medical School and Hospital announces that there will be available this year six scholarships under the terms of the Oliver-Rea Endowment.

The purpose of the Endowment is to award scholarships to practising physicians of the United States to defray in full the expenses of tuition at the New York Post-Graduate Medical School.

According to the wishes of the donor, physicians in the state of Pennsylvania will receive preference in the award of these scholarships.

Applications may be sent to the President of the New York Post-Graduate Medical School and Hospital, 20th Street and Second Avenue, New York City.

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ADVANTAGES OF TRIFOCAL LENSES AND REASONS WHY THEY SHOULD BE WORN.

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Those who have lost their accommodation often need to see clearly at distances intermediate between the reading point and infinity. Many who have not felt this need very much would find distinct intermediate vision very convenient. Trifocal glasses have been found practicable. The problems presented in connection with them have been studied and satisfactory solutions for them are here indicated. A better understanding of the subject will lead to the more general use of such lenses. Read before the Staff of the Geneva, N. Y. City Hospital, Oct. 4, 1920.

In this age men of letters and science, laboratory workers, students, watch makers, die makers, merchants and others want better vision. They demand seeing objects in detail. They demand perfect definition or resolving power at the various distances at which they work. Consequently, what they cannot see with their eyes must be seen thru lenses. What cannot be done with their accommodation must be done mechanically with the convex lens. A student's readiness to learn depends upon his ability to see in detail and to visualize mentally from spoken and written text. All learning is mentally recorded in picture form, visualized facts. Young artisans are constantly visualizing facts. With long experience they become valuable assets to the community. When they reach middle life and become most skillful and proficient in their vocations, these men should be at their best. At this very time accommodation disturbances are prone to begin and the worker suffers from defective vision and becomes a problem for the eye specialist. Lenses must replace mechanically what was lost physiologically. If lenses can be made to give fairly perfect definition of vision at all distances then we can place these patients, in their various vocations, in a class with the young men, with a constantly increasing efficiency, instead of among the aged with a decreasing efficiency.

This old men's class will not be thrown out of offices, factories, shops, etc., at fifty-five or sixty years of age because they cannot produce in competition with the younger men. They will become more valuable because of their longer experience. They will not become dependents upon their relatives, friends or the community, but instead will be of great economic value to the state. All men must see well to attain their greatest efficiency. Therefore, when production is increased, men will be better paid, investors will get better dividends, merchandise can be sold more cheaply by the manufacturer both to workman and public alike.

Robert Hooke, in 1674, in dealing with the power of the human eye to distinguish double stars and to see two points, or two details of an object as two, concluded that the two stars or two points of any object must be at least far enough apart to make the visual angle one minute of arc. A few people can distinguish double stars with a visual angle of less than one minute, but for many people the visual angle must be greater. If the visual angle is too small, then the two stars or the two points appear to fuse and form one. The visual angle of one minute then does not represent the limit of visibility, but the limit of resolution, that is, seeing two objects as two separate things. Now as the visual angle under which any given object is seen

depends upon its distance from the eye, and the power of accommodation, for the distance in the eye is limited, and this power decreases with age, if very small objects are to be seen, or the parts of larger objects are to be distinguished as separate details, there must be some means of enabling the eye to get very close to the object. The convex lens serves to increase the visual angle under which an object is seen, thus virtually making it possible to get the eye very close to the object, and still retain the sharpness of the retinal image. Or, to put it another way, the convex lens helps the eye to produce a larger retinal image and makes the details large enough to fall upon more than one of the retinal elements, thus making resolution possible. One other thing must not be forgotten. The intensity of the light on an object varies inversely as the square of the distance. Consequently a lens that brings the object nearer one-half the distance, increases the intensity of the light on that object four times, which very materially assists in making resolution possible.

One of the main causes why the civilization of the world was so slow in advancing is the fact that men could not use their eyes much for close work after middle life, on account of their old eyesight or presbyopia. This was the case in Benjamin Franklin's day. The single lens seemed to be the one worn if any at all. He could see that before long it would not be possible for him to do his daily work with his distance lenses only. He realized that his *old sight* was coming. This fact would require stronger lenses for close work. He also found out that it was a constant nuisance to be compelled to keep changing glasses. Franklin's inventive mind conceived the idea of bisecting one reading and one distant lens, grinding the two halves into one frame, the weaker half for the upper or distance, the stronger half below for close work. With this invention he lengthened his years of usefulness. From his time on the bifocal lens became increasingly popular, and many new inventions came out, until today we

have a great many varieties of bifocal lenses. The bifocal lens has had its day. We are now in a new era. In order to meet the exacting demands of present day civilization we must advance and that advance in refraction work means the trifocal or multifocal age. Thousands are wearing bifocals and are well satisfied. But many are limited in their vocations by their use. Others are dissatisfied with their inability to distinguish details. They are unable to wear their bifocals at all. This necessitates the constant changing of glasses for their various working distances.

Accommodation may be defined as the power of the eye to focus rays of light upon its retina for different distances at different times. In other words, the eye cannot focus rays of light upon its retina from different distances at one and the same time. For example, the point of a pencil held six inches in front of the eye is not seen clearly (is hazy) as the eye looks at the printed page fifteen inches beyond: and, *vice versa*, the printed page is not seen distinctly if the point of the pencil is looked at. In the study of the normal emmetropic eye, it has been found that the amplitude, or range, or power of accommodation gradually diminishes from youth to old age and thus becomes very apparent at about forty-five years of age. This is the result of one or more changes: the crystalline lens fibers lose their elasticity, becoming more sclerosed, or the ciliary muscle grows weak, or both of these changes exist together. Amplitude of accommodation may then be defined as the difference between the refraction of the eye in a state of rest (or adapted for its far point) and in a condition of maximum refraction, or adapted for its near point. A knowledge of the power of accommodation is absolutely essential, so that any variation from the standard may be noted. The following table gives some of the ages from ten to seventy-five years, respectively, the near point consistent with each, also the amplitude of accommodation for each period.

Years.	Near Point.	Amplitude In Diopters.
10	7 cm.	14
20	10 "	10
30	14 "	7
40	22 "	4.50
45	28 "	3.50
50	40 "	2.50
60	100 "	1.00
75	Infinity	0

This table of near points applies only to emmetropic eyes or those eyes which are made emmetropic by the adjustment of suitable correcting lenses. The table of amplitudes, however, is the same, with few exceptions, for all eyes of whatever degree or amount of amblyopia.

In refraction work there are principally two classes of eye troubles: hyperopes and myopes, the former by far in the larger majority. Let us analyze what takes place by the following table, which gives the comparative near points, in centimeters, in an emmetropic eye, a hyperopic eye of two diopters and a myopic eye of two diopters.

Age—	10	20	30	40	45	50	55	60	75
Emmetropia nearpoint	7.	10	14	22	28	40	55	100	Inf.
2 D Hyperopia nearpoint... .	8.3	12.5	20	40	66	200	Inf.	100	Inf.
2 D Myopia nearpoint.....	6.	8.3	11	15.3	18	22	25	33	50

It is easily seen from the above table that an emmetrope at seventy-five years of age has lost his power of accommodation entirely, while a two diopter hyperope has lost his entirely at fifty-five years of age. The greater the degree of hyperopia the earlier is the power of accommodation lost. This lost power requires visual assistance and especially is this true when we reach the age of fifty or sixty years or thereabouts. We are able to give perfect corrections for distance. We are also able to correct perfectly for close work of ten, twelve, sixteen or twenty inches. With a sixteen inch correction one can read a magazine or newspaper perfectly at sixteen inches, but we find as we push the magazine away to twenty or twenty-five inches, there is a decided loss in definition. The letters, at first sharply defined, become gray and more indistinct as they are moved away, until they finally dis-

pear. In early middle life this condition is not so. But what can we do to regain this lost area of vision? One prominent surgeon called it his "No man's land." Our distant correction will not take care of it. If we correct closely for reading there is a space of twenty or thirty inches where it is impossible to have good definition with the customary presbyopic correction. The patient must either move toward the object to the limit of his corrected distance, in order to bring out the fine detail, or he must bring the object up to him to the same limits. Many times this is impossible, as for instance with surgeons, machinists, pressmen, linotype men, students in libraries reading titles of books on shelves, merchants looking at the price marks of goods on shelves, automobile mechanics making fine adjustments in almost inaccessible parts of engines, etc. One other thing that he can do, he may go without seeing in detail, he may just have *visibility* without *resolution*. That is what many do.

About five years ago I discovered

that I had great difficulty in seeing the sharp edges of the shadows as they crossed the pupils of patients' eyes in my shadow tests, working at twenty-six to forty inches while using bifocals. I also noticed in my nose and throat work that I could no longer see detail unless I put on a special correction for thirty inches. I could see well for the special distances for which I was corrected, altho my resolving power in both eyes is 190% with Ives' visual acuity test; but the necessity for constantly changing glasses was so great an annoyance that I began to cast about for some relief.

Out of my dissatisfaction sprang the idea of making a lens consisting of three parts, with a distant vision lens, an intermediate lens and a close vision lens, all in one. A trifocal lens. I made what I thought would answer my purpose. I tried in vain to wear this trifocal lens for one month and it

nearly drove me to distraction. Upon investigation I thought that I had discovered the reason for my inability to wear trifocals and experimented with another pair which proved much better, but still were not comfortable. I continued to experiment with a number of lenses in cemented form, in solid form and in Kryptok form until I overcame the difficulties, and now I find that my *trifocals* are satisfactory for all distances for which I care to work. It now seems impossible to use bifocals at all. Having found so great

azine print or Jaeger's number 8, in a good light. This will average between thirty-six to forty-five inches. Next I correct his presbyopia over his distant correction, for whatever distance he desires for near work, usually about fifteen inches. After which I find his range of accommodation, far point and near point with this correction, on Jaeger's number 8. For 15 inches, or +2.50 diopter, it will be between twelve and twenty inches, depending upon the case. For the intermediate correction I select such plus lens add-

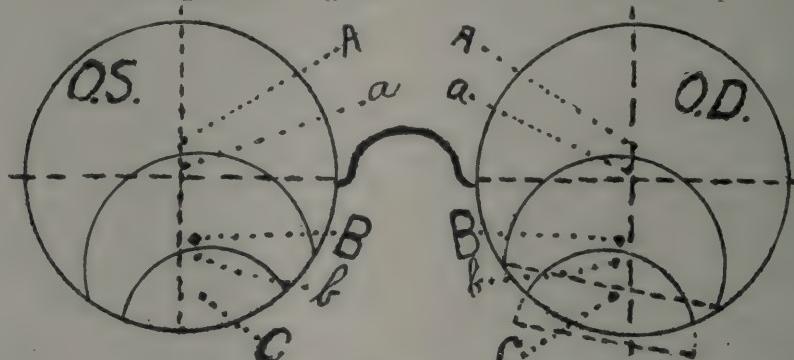


Fig. 1.—A and a points of equal prism power on each lens. Optional B and b points of equal prism power. B B and C C are distances between centers of area of the intermediate and reading wafers, and are respectively 3 mm. and 6 mm. less than the pupillary distance.

a pleasure in the use of my own trifocals, I began prescribing trifocals to surgeons who demanded that I give them a correction to see in detail from twelve to thirty inches, in addition to their distant lenses such as I was wearing myself. Then followed physicians, bookkeepers, bankers, machinists, die makers, etc. My conclusion is that trifocals, with all their added advantages, when properly corrected and made, can be worn with greater ease and comfort than bifocals. Any multifocal lenses, the individual foci of which are not perfect corrections for the several distances for which they are made, will be failures. The writer has one patient, a die maker, who is corrected at ten inches, sixteen inches, thirty-two inches and infinity in one combination.

My method of procedure is as follows: After correcting my patient for his distant vision, I find the near point at which he can read the average mag-

ed over the distant correction which far point will overlap eight to twelve inches the near point of the distant correction in each eye, using Jaeger's number 8. Next I try this newly selected intermediate correction to see if its near point will overlap, four or five inches, the far point of the full presbyopic correction, using Jaeger's number 8, in good light. This intermediate-addition is usually about one-half the added presbyopic correction.

The object is to select such an addition for the intermediate correction as will give an equal vision, for eight to twelve inches, on its far point as is given by the eight to twelve inches of the near point of the distant vision correction, using the same test type. In other words, for a space of eight to twelve inches the same test type is read equally well by both the distant and the intermediate corrections. If the proper intermediate addition has been given there will be at least five

inches between the intermediate and close vision corrections where, with the same test type, it can be read equally well with either correction. I add to or deduct from the intermediate correction so that these overlapping areas will be rightly proportioned.

The fitting of the frame is an important matter. I use a Bausch and Lomb Interpupillary Distance Gauge, which will give the correct interpupillary distances for distant, intermediate, and close visions. It will show if the crest of the nose is midway between the pupils. If

the presbyopic addition, less the intermediate correction. It must be remembered that the intermediate wafer gives part of the presbyopic addition.

These wafers, when cemented in place, should be of circular form, with the lower segment of the circle cut off so that the optical axis of each eye, with its up and down and side movements, will shift on and off the edges of the corresponding wafers at precisely the same time. This is very important. Trifocals are very annoying and frequently intolerable when at

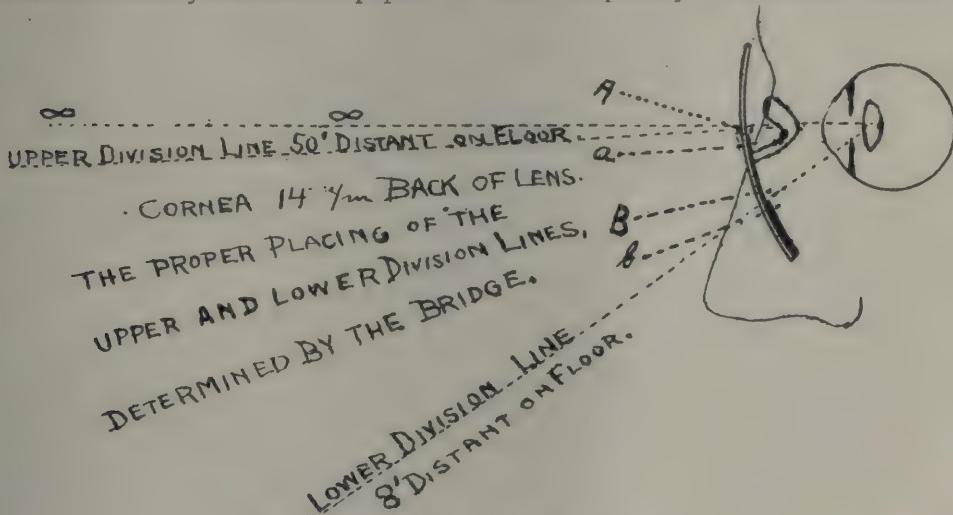


Fig. 2.—A a and B b equal prism power points

asymmetry exists, I make the proper nose piece and temple adjustments. I adjust the frame so that in looking in the distance the pupils are 3 mm. above line. I have the plane of the frame about 14 mm. from the cornea. I use the largest round lenses possible that will give the correct interpupillary distance. I use riding bows of the proper style and length.

I have obtained the best results from cemented trifocals by using a 30 mm. round, thin wafer, ground with proper corresponding curves to match the inside of the distant lenses. The wafer should be of such a strength, that, when added to the distant correction, it will give the intermediate correction. I have other thin wafers ground 24 mm. round, distal curve corresponding to the proximal curve of the intermediate wafer. The strength should be

times one eye is looking thru the intermediate correction and the other thru the distant, or when one eye is looking thru the close vision and the other thru the intermediate. In cutting distant meniscus or toric lenses it is necessary to decenter the plus lenses up, and the minus lenses down, sufficiently to avoid, as nearly as possible, the prismatic aberration, when the eye changes from the distant vision to the intermediate. If it is preferred this prism correction may be put in the wafers. The purpose is to obviate the apparent jump of the object seen, as nearly as possible, when changing foci. However, this jump or prismatic aberration between the intermediate and close vision wafer does not annoy very much because objects seen are closer by.

I am fortunate enough to possess an

Allen Foci-Prisometer made by the George S. Johnson Optical Company, Chicago, Illinois, on which I have placed an automatic centering and axis marking device. This instrument makes the decentering and proper placing of trifocal wafers on the distant vision lenses a matter of mechanics, instead of mathematics. The lensometer, made by the American Optical Company, Southbridge, Massachusetts, or the Axis Marking and Lens Centering Machine, made by the Standard Optical Company, Geneva, New York, are helpful accessories used in the making and checking up of trifocals.

Before cementing on the wafers, I place them, or a thin brass templet, shaped like the wafers, on the distant lenses. I place them in the exact position, proper height and decentering they are to be. I hold them in position with a small wire paper clip, then with a glass marking pencil, I outline the edges of the wafers on the front surface of the far-seeing lenses. These markings serve as a guide to correctly place the wafers, after cementing just before cooling. Having determined the proper shape of the wafers, I thoroughly clean the cementing surfaces of the lenses and wafers, being careful not to erase the position marks. I then place the wafers in their respective positions on the distant lenses, with Canada balsam placed between the cementing surfaces. Having done this, I place lenses and wafers on the low heat of an electric hot plate and cook slowly for a long time, one-half hour or more, depending on the amount of heat. Very little experience will teach one how long to cook them. After turning off the heat, I decenter the intermediate wafers 2 or 3 mm. in, top edge 3 mm. above line, and the close vision wafers each about 3 mm. in, with the width of the wafer about 11 mm. up and down. The position marks should correspond.

I allow them to cool slowly, and when cool I clean off any excess of balsam, after which I seal the undercut edge of the wafers with a clear shellac cement made 60% of 95% alcohol and 40% bleached dry shellac. (In making

this solution allow it to stand for several days, shaking occasionally. When a clear stratum of liquid appears I filter this clear liquid thru filter paper and add 2% castor oil to render it less brittle. Let it evaporate and use when about the consistency of thin syrup.)

After applying to the edge of wafers, dry with a gentle heat. If this is properly done there will be little or no excess to clean off with alcohol and the wafers will not come off until they are taken off. I direct my patients in the future cleaning of these lenses to dampen a clean cloth with a 5% ammonia solution and wipe clean. The chemistry is grease, plus ammonia, which forms soft soap and glycerin, a splendid cleaner. A horizontal turn table 80 or 90 mm. in diameter, marked on its surface with concentric circles, on which are two spring clips for holding the lens in position, is also of valuable assistance in sealing the edges of wafers.

The natural standing position of the patient should determine the height of the wafers. Standing at ease naturally, the line between the distant and the intermediate vision should be fifty feet away on the level floor. The slight floor blur of the intermediates inside of this distance does not annoy the patient very much, because if he wants to see anything more in detail within that distance, he may do so by slightly dropping his head and using his distant vision lenses. The intermediate and close vision division line should be seven or eight feet on the floor in front of the patient when standing erect and at ease. Eye specialists will be surprised how well these trifocal patients get along with this 11 mm. wide lower or reading wafer. Nearly all of their near work is done thru the intermediates.

The writer does not claim that every presbyope should have a pair of trifocal spectacles. There naturally are many impossible cases, and many that do not need them. To my colleagues who wish to try prescribing of trifocals, I would say, be very careful in selecting your cases, especially at first, and work in conjunction with your manufacturing optician and you will be happily surprised with your results in the new field.

THE NATURE AND TREATMENT OF STRABISMUS.

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Starting from Parinaud's conception of the nature of strabismus and the facts brought out by use of the diploscope the writer traces the double origin (nervous and optical) of strabismus. Educational treatment is indispensable, but must often succeed surgical intervention. The importance of the exhaustive study of each case is insisted on.

Oculists do not seem likely to agree among themselves on the nature and treatment of strabismus, despite the numerous treatises, some of quite recent date, which have appeared. The most varying opinions have been held and still find their convinced and authoritative defenders. The affection was, for some time, believed to be of muscular origin, thereby confounding it with deviation or squinting, which is an important symptom, but neither characteristic or always noticeable. Donders evolved really scientific explanations, and tho their value must not be exaggerated, it is certain that they are one of the greatest steps towards progress which has been accomplished. Javal, in turn, devoted a highly interesting volume of minute observations and documents to the theme.

Parinaud finally enlarged on the conceptions of his predecessors, and decided that strabismus was a faulty development in the apparatus of binocular sight. His opinion has become classic, and his masterly ideas have been exploited in the interesting work of Sauvinaeu. The given theory of a complaint has not alone an historical interest. It is generally admitted that any belief, be it true or false, gives rise almost always to appropriate actions. That is the case with strabismus, the treatment of which, after an entirely medical period, has become almost exclusively surgical; it has now entered a medicosurgical phase.

The subject has been treated so fully and repeatedly by so many eminent men that it may be pretentious in a newcomer to risk a few criticisms. Our excuse is, that in coming after them, we have profited by the ingenious apparatus our illustrious predecessors lacked. The ideas which we in turn, express are the result of numerous ob-

servations made either in hospital or among our patients. We have been helped in the long and difficult work by the valuable counsel of Professor Lapersonne, our tutor, and the frequently recalled advice of Dr. Rémy, the inventor of the diploscope.

Dr. Rémy¹ made his first experiments in the year 1901; since then some modifications of detail have been added to the diploscope, by several oculists and by himself; but these modifications have not altered the first conception, and the ingenious apparatus remains practically the same. The diploscope essentially consists in a large tube, closed behind by a plate moving on its own axis. This plate is pierced by four separate holes, one at 4, the others at 6 centimeters. Two openings only are visible at the same time, owing to the action of the operculum. The apparatus is placed horizontally on a stem of 1.25 m., ending at one end with a chin support, or two eye holes, and at the other with printed letters, of which the number varies, according to the nature of the experiment, between 2, 3 or 4. The rotation of the plate allows the numbers to be seen horizontally or vertically. Dr. Rémy has also constructed a smaller diploscope, differing from the preceding model, by its lesser length and the absence of the tube. The following illustrations will, we think, facilitate the comprehension of the simple technic of the apparatus.

The slightest alterations in binocular sight are immediately recognized by the displacement of the letters, which no longer appear in their normal place, but in crossed diplopia if there be divergent strabismus, or in homonymous diplopia, if the strabismus be convergent.

We shall not dwell upon the great developments of Parinaud's² theory,

only we must insist on the fact that according to this author, strabismus is always an affection of childhood. In any case, his definition is extremely explicit. It is a question of "a flaw in the development of the apparatus of binocular sight, preventing the convergence of the eyes upon a fixed object." It is a disorder of central control in the reflex of the convergence. If this last be exaggerated, there is

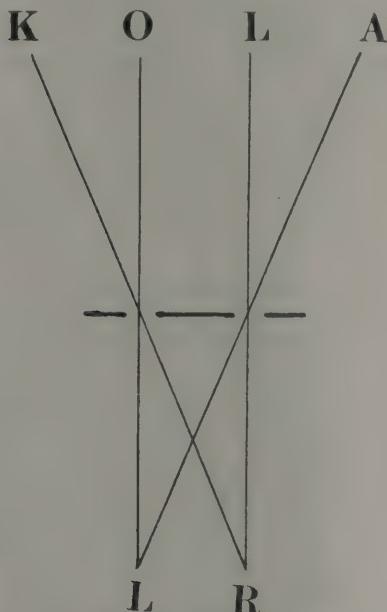


Fig. 1.—The four-letter experiment for normal eyes. R. and L. are seen by the right eye. O. and A. by the left eye. The two openings furthest apart are placed horizontally for this experiment.

convergent strabismus; if it be lessened, divergent strabismus supervenes. The cerebral trouble itself may be primitive, and may, by that fact, prevent binocular sight, or it may supervene early and impede normal development. (Parinaud, pp. 19, 48, 50, 98, 115, 124.) M. Sauvaineau,³ in adopting this idea, wishes to localize the cerebral trouble more precisely still, to the center of the convergence (Sauvaineau, loc. cit., p. 146).

Thus strabismus, which was according to savants a local affection of visual or muscular origin, became, according to Parinaud, an affection of the central control. The superiority of

this conception over its often inadequate precedents cannot be ignored. It appears to be not only the most natural but the only probable explanation of certain forms of strabismus, more particularly those which supervene when optical causes are at fault. Two children possess the same refraction, the same visual acuteness, one has a direct gaze and normal binocular sight, while the other is strabismic. There

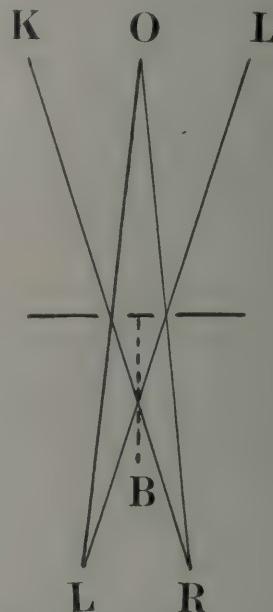


Fig. 2.—Three-letter experiment for normal eyes. K. and O. are seen by the right eye. O. and L. are seen by the left eye. If the bar placed vertically in front of the tube is lowered, O. alone continues to be seen by both eyes, K. and L. having their rays intercepted. The two nearer openings are placed horizontally for this experiment.

must be a cause for the latter condition, and since it does not exist in the eyes, it must be sought elsewhere, that is, in the brain. Strabismus is, so to speak, the sign of organic decadence, a stigma of degeneration.

The important part played by all sorts of infectious maladies, measles, scarlatina, typhoid fever, in the case of the child, is thus wonderfully explained. Convulsions, it is well known, are frequent in the previous life of the little strabismic. Professor Fournier and Dr. Antonelli have, on their side, pointed out, perhaps rather immoder-

ately, the importance of syphilis in the progenitors; also, there is the question of consanguineous marriage, or of alcoholism. To sum up, it seemed probable that all causes capable of bringing nervous troubles, could in a certain measure disorder the delicate machinery of binocular sight.

The nervous theory of Parinaud would, if necessary, serve a clinical argument. Strabismic children are often not only irritable and nervous subjects and actual neuropaths, but strabismus itself presents at times considerable individual differences. All those who have treated children know that the strabismus may rapidly improve under the influence of glasses and atropin, there are unhappily fairly numerous cases where the best informed usual therapeutics show themselves particularly inefficacious, whether they be applied to the generally convergent form of the strabismus itself, or to the pre-existent nervous cause.

But if Parinaud's theory throws a new light on cases of strabismus that supervene where the child's eyesight is almost normal, it becomes less necessary, tho still very useful, in explaining the form of strabismus that Donders has attached to refraction troubles, and principally to the discord they establish between accommodation and convergence. In fact, the greater part of these strabismics generally give way fairly quickly to suitable optical treatment. Consequently, it becomes difficult to determine the part of ametropia and that of the nervous system, in the evolution of the ocular affection. The interpretation may become singularly embarrassing, and a minute examination of the subject and its antecedents will be found necessary to specify the etiology.

Regarding strabismus in the adult, Drs. Parinaud and Sauvaineau are most discreet. If they speak of it, they call it an old strabismus, or explain it by a nervous anterior predisposition. Our intention is to show precisely that this affection can supervene among individuals whose binocular sight is perfectly developed, and without necessarily being connected with special nervous in-

fluences. This variety of strabismus is a particularly interesting study, because it is peculiar to adults, and its evolution can, so to speak, be easily followed from day to day. But, before we go into the numerous points which form the basis of this study, it would not be uninteresting to come to terms with strabismus itself.

Strabismus must not be identified with deviation, which may not be present in strabismus, but may appear in totally different disorders such as paralysis, or tumors of the orbit. Comitant strabismus is essentially a disease of binocular sight, preventing the convergence of the eyes upon a fixed object. The visual trouble varies according to the evolution of the strabismus.

Normal binocular sight is first attacked by simultaneous vision, in which both eyes, tho one is often weakened, preserve their visual powers. Thence the patient experiences more or less marked inconvenience, rather indefinite and generally of short duration, during which deviation is rarely apparent.

This period is soon succeeded by partial simultaneous sight (simultaneous sight of Parinaud) which we have elsewhere called panoramic vision. Parinaud has defined it very well in further naming it alternating central vision. Neutralization (suppression, inhibition) is the most typical and curious characteristic of this period. However, as neutralization has its adversaries, it is necessary to agree upon it. Parinaud, in his treatise, says of it, "The physiologist looks upon it as a word without significance," (p. 96) and since then the criticism, given in superb style, has enjoyed extraordinary popularity. Indeed, one must not be led away by words, since, whatever the cause, neutralization is distinctly one of the most clearly proved facts, not only with regard to sight, but to the other senses. The more the latter become complex, the more they teach us, and the more they neutralize. As a principal effect, the attention we bring to bear on a subject lifts it from its frame and separates it from surrounding con-

tendencies. In a word neutralization is not a particular act of the sight, but a general phenomenon, as necessary to our intellectual activity as the shades are to the lights of a picture. This is so true that in some nervous pathologic conditions fatigue will be enough to lessen this faculty and bring about different and trying disturbances. We ourselves have come across many strabismic patients who suffered almost continually from diplopia.

In panoramic sight, neutralization is the reaction of the defense against diplopia, and the more rapidly it intervenes, the less the subject suffers from the preceding period. This neutralization is elective and keeps exclusively to that portion of the retina corresponding to the object seen by the non-deviating eye, and avoiding the other regions of the visual field. For this reason we have called this form of sight panoramic. The diploscope makes the study of neutralization an easy matter, and by the judicious use of this instrument, it can often be made to appear and disappear at will. At any rate, alternate is the opposite of simultaneous and nothing is more certain than alternating central sight, if it be not alternating central neutralization. There has been a mere wordy quarrel concerning it, and we hold, nevertheless, to the neutralization admitted by Graefe and Javal as a characteristic and indisputable fact.

Neutralization does not always conduct itself along the same lines. It is alternating and generally remains so, when both eyes are of equal strength; or when one is far-sighted and the other near-sighted.

But at times, without appreciable cause, or with more reason, where one of the two eyes is manifestly inferior to the other, neutralization becomes fixed; and alternatively the sight becomes monocular. This new stage is the graver on account of the momentous disorders it brings about. One of the most embarrassing of these accidents is amblyopia ex anopsia, so called because it is not accompanied by any appreciable alteration, sufficient to explain it. It is frequent and often considerable in the case of a

child attacked by convergent strabismus. It is much less marked in cases of myopia, or, when an adult is attacked by divergent myopic strabismus. Even when of long duration, the functional diminution of sight rarely exceeds a few tenths. An exact optical correction and a few exercises will, in this case, generally suffice to bring about a rapid and complete restoration of the sight.

Simultaneous vision, alternating central or panoramic vision, monocular sight, these are the stepping stones, the successive and characteristic stages of strabismus. In the course of this affection, amblyopia and deviation itself, are but frequent and simple, tho often very annoying accidents.

Strabismus, thus understood, may make its appearance in an adult endowed with a perfectly developed apparatus of binocular sight. This certainty, with us, is the result of numerous minute and most affirmative observations. If the contrary idea has been overvalued or overpraised, it is certainly due to the difficulty of examination, and the imperfection of the apparatus employed. Rémy's dipscopes⁴ have allowed us to follow the evolution of strabismus, in a large number of patients of varying ages. For the sake of precision, we will give a summary of some of these cases further on.

An appreciable difference in the sight of the eyes is the usual cause of strabismus in the adult. Hering compares the optical apparatus to "a double team driven by single reins." We will use his ingenious idea. If one of the team goes lame, it either stumbles on with difficulty or stops and must be detached. It is the same case with the sight. The causes of strabismus in the adult, are there, very varied. A unilateral and rather tardy myopia, a traumatic cataract, monocular aphakia and, lastly, to generalize, any accident which brings about an appreciable difference in the sight of the eyes, enter into the question. We have recounted thirty cases of anisometropia, chosen from many others, in our inaugural treatise. Each time the difference of refraction exceeded two di-

opters, a visual alteration, an actual strabismus existed before correction. Dr. Sauvaineau, who cites this fact, adds however, further on, that he has not much belief in the influence of anisometropia as an essential factor of strabismus. We reply to this that if among the patients examined, a certain number were attacked by anisometropia in childhood, others were numerous, who did not suffer until adult age; when, so to speak, the development of the apparatus of binocular sight was perfect.

Thus, strabismus is infinitely more frequent than is generally believed, and a methodical examination, with the diploscope, of persons afflicted with defective sight gives adequate conviction. The numerous researches we have made, since our treatise, confirm this view.

It would be no doubt exaggeration to say strabismus presents special characteristics, which distinguish it from previously described forms. Though lacking in very marked differences, strabismus is, however, accompanied by slightly peculiar symptoms. The onset of strabismus in the adult as in the child, is slow and progressive, and of insidious growth. Also, apart from the more or less acute sight troubles, usually attributed to fatigue, the patient rarely complains. Deviation is more interesting. At times, it is very marked, but more often it remains trifling and it is chiefly in such cases that invisible strabismus (*heterophoria*) is frequent. On interrogation, however one often learns that a certain amount of deviation in the vague gaze, has sometimes been noticed. Stereoscopic vision may exist and the diploscope is almost indispensable to make the alterations in binocular vision manifest. Let us also remark that large as well as small diploscopes are necessary, for the sight may act differently near to, or at a distance. Deviation, apparent or not, is nearly always produced from outside, and divergent strabismus is much more frequent.

Amplyopia ex anopsia is less pronounced. It has surprised us more than once to find patients, who had

suffered from unilateral myopia for twenty years and who, even in reading use their emmetropic eye, obtain almost immediately, excellent sight with their correction. In short, this strabismus is more frequently seen among perfectly balanced and healthy individuals, with whom the affection is ocular, and purely accidental.

We will point out later, in speaking of treatment, the very great curability of this form of strabismus. We will now cite, as briefly as possible, the following cases:

CASE I. The patient was a boy of 14 years of age, whose left eye had become myopic following keratitis. We saw him for the first time at the Hotel-Dieu, on the 15th of May, 1905. According to the skiascope, M. Me. . . is emmetropic in the right eye and myopic in the left 4.50 D.

Vision R. = 0.9. In L. = 0.1, after correction 0.9.

We examined him diposcopically. His sight, without correction is alternative, and his myopic eye serves for nearer sight. After correction, neutralization persisted for a time, then simultaneous vision appeared, acting divergently. Binocular sight commenced to become normal at moments, two days afterwards, following a course of exercises. By the 20th of May, the patient had acquired normal binocular sight, without effort. He wore his correction. His sight was still good, when we saw him again, three months later.

This patient is of interest for two reasons. No deviation was apparent, and stereoscopic vision came on directly after correction. Moreover, this patient also had strabismic sight.

CASE II. The case of Mlle. Em. Mart, aged 17, is rather different. We saw this patient on the 2nd of August, 1904, at the Hotel-Dieu. She presented a paracentral leucoma of the right eye and myopic astigmatism.

Skiascopy: R.: Vertical—11. D., horizontal—6. D.

Ophthalmometer: R. = 5. D. Ast. L. = Normal.

The sight of the right eye after correction, equalled 0.5 only. This girl squinted very markedly outwards and

a little above, but this deviation was not visible at first. With the large diploscope it took a half hour of rather trying exercises to make the neutralization, which was alternating, disappear. Her sight soon became simultaneous, and the diploscope revealed a divergent and sursumvergent strabismus, of which we already felt sure.

Next day, her sight was still simultaneous, and the letters seen by the right eye, armed with its correction, appeared much smaller. We diminished the strength of the spherical glass by 1.50 D. and immediately the letters became equal. Two days later we returned to our first correction: R. E. (horizontal axis —5.—6.) and the letters remained the same size. The sight of the right eye is now 0.9. The binocular vision is normal. In this case, exercises for six days sufficed to cure a strong ametropia, complicated by astigmatism, and a double deviation, one of which was quite considerable. Seen two months later, the sight of Miss Mart . . . remained perfect.

CASE III. Here is a quite personal experience. "We have systematically corrected one of our eyes, for some days, tho both are almost equally myopic, 5 dioptries. Some days we have experienced a rather violent disturbance and evident ocular fatigue. The change of sight, tho very appreciable, was rather difficult to define. To the uncorrected eye, the image was naturally much less clear and of diffused outlines. Literally speaking, no diplopia existed, but rather a superposition of objects, unequal in drawing and size. Light chiefly showed this disturbance. Seen in front and at a certain distance, the gas jet had the following appearance: The jet and its cylinder of very precise and very luminous contour, were in the center, surrounded by a very widely diffused object, without clear limits. As soon as the vision became slightly lateral, the two reflections persisted, but without preserving their relation, and the more the vision became eccentric, the farther away they drew from each other. After a week, the habit was acquired and a strong tendency to deviation in the left eye was remarked at this moment;

the vision was clear. The trouble persisted rather longer with very luminous objects. The integral correction of our eyes was speedily followed by a return of binocular vision, still, it required some days to become perfect and natural.

We have dwelt upon our case because it is very significant. A difference of 5 diopters very rapidly determines simultaneous vision, which corresponds to the trouble experienced, then neutralization intervenes, the sight becomes clear, but only one eye acts, and the deviation of the left eye becomes evident.

OTHER OBSERVATIONS.—We do not wish to extend the detail of these observations. We will, however, quote the case of Dr. G— of Paris. This colleague, who was about thirty-five years of age, had, for a long time, an unilateral myopia of 6 diopters and a divergent strabismus of 32 degrees. The sight of this eye was normal, after correction, the convergence being very well preserved. It was decided to operate. Nevertheless, on our insistence, his physician allowed us three weeks in which to try orthoptic treatment. Neutralization was difficult to conquer; and to revive diplopia we had to employ 70 diopters of prisms, afterwards rapidly lessened. After six treatments, which did not, on an average, last longer than three quarters of an hour, the sight became normal. Afterwards, our colleague, provided with his correction, found no difficulty in driving his automobile.

To this case may be added the following observations of Parinaud:

A young man of 14 suffering from convergent strabismus of the right eye, of 30 degrees, had myopia of 8 diopters and a hypermetropia of 0.5 D. in the left. "After a year, the strabismus completely disappeared under anisometropic correction."

The recognizing that the treatment, logical as it was, had been employed in a totally empirical manner, this cure certainly goes to confirm our ideas on the origin and treatment of certain strabisms.

Lastly, if trouble is taken to seriously examine the eyes of patients suf-

fering from monocular aphakia, which case is of fairly frequent occurrence, in hospitals, a true strabismus, which will only yield to suitable exercises will be invariably remarked, before as well as after correction.

These few examples could be largely multiplied from the number that exist. It seems that the conclusion drawn from them insists on a place for strabismus of a purely visual origin, besides strabismus whose primitive nervous origin appears indisputable. And this gives justice to those eminent scientists like Javal, who have defended the optical origin of strabismus. Their arguments were true and they were often in the right. This remark does not tend to lessen Parinaud's merit, for it is very difficult, nay, even impossible, to cover all cases of strabismus with a single formula. If the well known French axiom be true, "Il n'y a pas de maladies, mais des malades" (there are not diseases but patients), it has been written of strabismus, for an affection with more varying symptoms does not perhaps exist. It may be said without exaggeration that one does not come across two strabisms in a hundred exactly alike, so much does the individual character show itself in the smallest details. In any case, theories are but relatively truthful, however ingenious they may be. They are imagined to explain and arrange facts, and ought to be mixed with a slight indifference, an indiscreet curiosity.

Otherwise the dangerous custom of giving facts an erroneous interpretation is acquired. We have undertaken this work because it seems to us that a too important part in the treatment of strabismus is given to overtheoretic ideas, estimating that it would be expedient, in various clinical affections, to oppose, within limits, an appropriate therapeutics.

The treatment of strabismus is at present understood in very different ways by the greater number of oculists, with no precise rule in its application, and many variations of detail. In any case modifications only deal with operative treatment, which alone counts with the majority of practitioners.

It seem to us that the time has come to apply a little more method and precision to the treatment of so common an ailment. That it is a particularly delicate and embarrassing work is not to be denied. It is not, however, a question of employing any new method, only of utilizing, with more advantage, relatively old aids, and of conciliating as much as possible therapeutics and clinical instruction.

Convergent strabismus is particularly frequent in children, but its origin is not always recognized as the same. It is very often allied to a nervous central disorder (Parinaud), at times the influence of refraction is shown (Donders); and in other cases these two causes mingle so closely that it is impossible to say which part is due to the nervous system, and for which abnormal refraction is responsible. Therefore, we will not attempt to lay down a treatment for these etiologic varieties. In fact, such precision seems to us impossible, and the practitioner should above all be inspired by circumstances.

The greater number of authors agree on the treatment of convergent strabismus, and differences of opinion are chiefly addressed to questions of detail. In one of his lectures published by the Presse Médicale, Professor de Laperonne has magisterially studied operative indications in strabismus. He has clearly and precisely pointed out the precepts to be drawn from age, refraction, visual acuteness, from the degree of strabismus, and from the patient's antecedents. We cannot do better than to repeat them to our readers.

Speaking of surgical treatment, he insists on the reason for rejecting too hasty intervention, that is, before the patient is ten years old. Too early operation may result in complete failure, and even in a disaster difficult to repair. We will not speak of operations for strabismus; their indications and technic have been set forth with precise and circumstantial detail in Dr. Terrien's fine "Treatise on Ocular Surgery."

When a child suffers from strabismus the primary treatment consists in an earnest and serious examination,

and an exact optical correction. Orthoptic treatment ought, afterwards, to be seriously prescribed, whenever visual acuteness is normal, or tends to become adequate. We here give some rather important details on this subject.

The strabismic child very often presents amblyopia ex anopsia of one of its eyes. This amblyopia is considerable at times, and prevents all re-education of binocular sight; therefore, our efforts should, first of all, be centered on its cure. The greater number of specialists order as an efficacious means, the wearing of an occlusive band, or an opaque disc, on the healthy eye. This, according to our idea, is a means that should never be employed, unless one is forced to it; it has the serious disadvantage of being long, tiresome, and only too often ineffectual. Amblyopia submits, with bad grace, to this treatment; and on the other hand, it is satisfied with rather weak visual acuteness, which it does not try to further enlarge.

As we have already said elsewhere, it is better to make the patient exercise under supervision. After bandaging the healthy eye, the letters, which assist visual acuteness, are brought rather close to the patient, so that he can distinctly read the largest characters with his amblyopic eye; they are then progressively drawn away. We have, in some cases, been able to increase the visual acuteness of the amblyopic eye by several tenths with a single treatment. In spite of all efforts, in other cases the acuteness makes very slow progress. The only fault of this treatment is the fatigue it imposes on youthful patients, which necessitates, particularly at first, exercises of very short duration.

As soon as visual acuteness attains at least a tenth, orthoptic exercises ought to commence. Javal had recourse to the stereoscope, and it is on this instrument, more or less modified, that most oculists depend. Convergent strabismus can certainly be cured in this way, only the use of the stereoscope in such an affection appears almost paradoxical. Indeed stereoscopic sight demands parallel ocular axes,

that is to say, of relative divergence. Doubtless this fact explains the very great difficulty which this treatment presents. Moreover, the stereoscope has other faults no less grave. Experiments with this apparatus are difficult of control, exercises can only be made at a short distance, and above all, stereoscopic vision differs from binocular vision. It seems, then, once divergent strabismus cured, that this apparatus may be of use with a view to obtaining slight surcorrection. Its use after the cure of convergent strabismus would not be advisable.

The length and difficulty of such a method had doubtless far from encouraging results. The following phrase of Javal, quoted by Professor de Lapersonne, demonstrates this fact: "The reestablishment of binocular vision by exercises usually requires as long a time as that which has elapsed since the commencement of deviation. A child of eight who commenced to squint at four may be cured at twelve years of age."

Many other forms of apparatus have been employed since this epoch, such as the amblyoscope. But among them all, Rémy's diploscope appears to us to assure the best and easiest results. The marvelous precision of this instrument, its variety of exercises and the ease with which it is understood and may be controlled at every instant, allow of its use, even with very young children. We have treated a four-year-old baby, by replacing the letters, which he did not know, by the figures of animals. His German governess explained the movements to him and we have obtained the most excellent and unhesitated for results.

The end to be attained in the first place is diplopia. With a little practice in varying the letters, and the intensity of light . . . neutralization is generally vanquished fairly quickly. Consequently, the exercises assist two objects; they make the amblyopic eye work, and strengthen its acuteness; they contribute at the same time to lessen the deviation of the eyes.

If taken in good time, and if secondary modifications have not already appeared in the muscular apparatus,

there is every chance of obtaining entire success. It must not, however, be denied that the cure of strabismus by exercises is, as a rule, long and arduous. It demands the hearty cooperation of the patient, and unending patience in parents and doctor. There are many reasons for this, but the greatest of all is the difficulty of obtaining divergent movements of certain duration. Still, as good results follow fairly frequently, one must not despair too quickly.

Even where these means fail to cure, the exercises prepare the ground in a wonderful manner for surgical intervention. To commence with, they cure the amblyopia ex anopsia, they revive diplopia and finally and notably reduce deviation. The surgeon will know exactly what the operation demands and it will be performed under the best possible conditions. Even then, the oculist's part is not ended. In an immense majority of cases, no operation, however successful, gives more than a cosmetic result. It is therefore the moment to continue orthoptic exercises, which are alone capable of assuring a complete and definite result, by inducing perfect binocular vision.

While on this subject, we cannot agree with the many practitioners who content themselves with advising parents to buy a stereoscope, and some Javal's cards. Stereoscopic exercises, interesting tho' they be, are too difficult to control. The doctor's presence is a necessity, otherwise parents and patient quickly relinquish the instrument. Diploscopic treatment is preferable, on account of its rapidity, as well as for reasons already given. Stereoscopic vision should not be exercised until the patient can easily do the exercises of both dipscopes, and then only with a view to obtaining slight overcorrection. Naturally optical correction must not be neglected, whenever it may be useful to increase visual acuteness.

Thus, the cure of convergent strabismus is far from being the simple and easy matter it is so wrongly thought to be. On the contrary, it demands sustained effort from the patient and necessitates in the doctor the closest

vigilance and much facility in the practice of exercises.

DIVERGENT STRABISMUS.

Even in the most justly appreciated and widely spread treatises, the accepted opinions on divergent strabismus seem to us to call for a few reservations. With the exception of the most recent works, the greater part of which have appeared in periodicals, their authors are, more or less, partisans of surgical intervention. With them, operation is the chief element of success, and orthoptic exercises are of much less importance, having only a complementary value.

This idea, shared, moreover, by the majority of oculists, depends on various reasonings. The reports on convergence and the much narrower accommodation here, the slow evolution which often precedes insufficient convergence and its habitual tendency to increase, help to render divergent strabismus rebellious to all optical treatment. Thus, operation was advised in the greater part of strabismic cases, even when the strabismus was unimportant and periodic.

We have not agreed with this opinion for a long time. In all that concerns divergent strabismus, we repeat what we have said with regard to convergent strabismus; each affection is distinct and requires careful study, not only of its actual symptoms, but as far as possible, of its probable causes.

Indeed, it is very certain that in this form of strabismus the reports of convergence and accommodation are far from bringing about such direct consequences, and it is equally certain that evolution here tends towards aggravation rather than cure. Does this mean that we must look upon dioptric treatment as useless and relegate it to the position of a mere accessory? We do not believe so and we will explain why.

To do so, we must insist upon two essential points intimately allied to the pathogeny and treatment of divergent strabismus. Divergent strabismus and insufficient convergence have been united to such an extent by so many authorities that it is difficult to take the other side. In fact, strabismus, ac-

cording to them, is very often preceded by more or less congenital insufficiency of convergence. There is some truth and considerable error in this view.

It often happens, and Parinaud, with perfect right, insists on the fact, that insufficient convergence is the first distant cause of divergent strabismus, which appears at a very much later date. This insufficiency appears to be of nervous origin, and it is, moreover, seldom accompanied by refractive troubles. The sight of each eye is normal. As soon as the patient makes efforts at convergence, one of the eyes becomes fixed and does not pass over the median line. Fatigue and even pain quickly follow a prolonged effort, without a sensible increase of convergence. In the adult, this insufficiency frequently develops into a more or less important strabismus. But such cases seem rather rare; at least, they have always been exceptional in the cases of strabismus we have attended.

Besides this ordinary insufficiency, which is very prominent and generally congenital, one might almost say essential, there exists another insufficiency of convergence, which often attacks both eyes, but as a consequence of strabismus instead of a cause. The absence of convergent movements brings about fatigue, and actual muscular impotence. It is found in the careful examination of patients suffering from a fairly old divergent strabismus, that sustained efforts at convergence very rapidly produce in the ocular globes, badly coordinated oscillatory movements, which tend to a very imperfect convergence. It is therefore a question of acquired weakness, not functional impossibility, for if patients are submitted to continuous appropriate exercises the rapid reestablishment of functional convergence is nearly always brought about. On the other hand, the insufficiency may be due to other motives, and it may, in certain cases, be entirely at fault. We can recall patients who suffered for ten years and more from divergent strabismus, without presenting the very slightest degree of insufficient convergence.

Another and no less important point of which we have already spoken con-

cerns the optical origin of divergent strabismus. The most common cause of adult strabismus, outside those injuries and disorders of the eye capable of compromising binocular vision seriously enough to authorize its re-establishment, is anisometropia, that is to say, a difference in refraction between the two eyes. For some time the trouble induced is perhaps more real than apparent; the ocular movements seem normal, the convergence itself appears unaltered. Nevertheless a closer examination demonstrates the almost complete destruction of binocular sight, and we learn on interrogation that the gaze deviates at times. This deviation often becomes more apparent than pronounced, at other times it develops into an evident and even important divergent strabismus.

It is necessary to lay stress on these two factors, so important is their part in therapeutics. We will now demonstrate that they really constitute the greatest obstacles to a cure.

Many authors agree in asserting the impotence of dioptic treatment in divergent strabismus. This impotence is, in great part, due to the ineffectual remedies opposed to anisometropia and insufficient convergence.

Let us put the strabismus united to congenital convergence on one side. It is rather a case, and is less a question of treating strabismus than of remedying insufficiency. If medical treatment appears incapable of success, there is always the resource of surgical intervention, after which a few exercises generally suffice to restore binocular vision.

Divergent strabismus is frequently united to anisometropia. It must be acknowledged that an entirely empirical treatment has been too long looked upon as a cure. The patient, once provided with an excellent correction, should, without further indications, accustom himself to this correction. Ignorance as to the disorders of binocular vision, and the absence of controlled apparatus were responsible for this way of thinking. Clinical surprises are often curious, and it has occurred that some patients have been more or less rapidly cured by this means. Generally,

they have quickly given up the correction, which, far from ameliorating the sight, became a sources of serious inconveniences, such as vertigo, nervous headache, false relief, and dizziness. Taught by these facts, practitioners have wisely dissuaded the correction of anisometropia greater than a diopter and a half.

In our turn, aided by Rémy's diploscope, we have resumed this study, and found reasons to oppose an integral correction. These reasons are two in number; strabismic deviation — the cause of more or less obvious diplopia, which is often sufficient to awaken improved visual acuteness—and the unequal size of objects seen by each eye. Many years of experience convince us that the inequality in the size of objects, which is such a trouble to the patient in the beginning, never persists. It is not so with deviation; this requires a more or less lengthy treatment, and only yields to a course of suitable exercises.

We lay stress on the fact that the difficulty in curing an anisometropia and its accompanying deviation does not depend on a more or less marked dioptric difference—an anisometropia of ten diopters may be much easier to cure than another of three diopters. It is equally independent of the greatness of the deviation itself. The real difficulty arises from the insufficient degree of convergence. That it is which causes all delays in cure, therefore our first effort ought to be to diminish and vanquish it. Convergence once established, victory is at hand, for the reeducation of binocular vision becomes henceforward rapid and easy.

The habitual treatment of insufficient convergence ought always to be pleasing. If it is a question of a slight degree, the wearing of prisms, or the decentering of corrective glasses is generally advised. This method presents some grave disadvantages; it makes an inadequate, heavy, and sometimes dangerous palliative.

The insufficient convergence common to strabismus is far from having absolute stability, therefore prismatic correction has not all the precision one could wish. On the other hand, if

it exceeds, by ever so little, a few diopters, the glasses become too thick. One may even add that the cases which might be benefited by this treatment are rare. Lastly, and herein lies its principal fault, this method does away with all serious and useful efforts on the part of the patient. Now, it would be better, if possible, to re-establish an important function, all the more easily cured, because frequently united to a weakness due to actual alteration. For that reason, the procedure of reeducating convergence is more preferable. Tho undoubtedly more difficult, it has the incontestable advantage of curing the affection and may be applied to all sorts of cases, even to those of a degree opposed to prism correction.

Stereoscopic exercises are often prescribed to improve insufficiency. This method, faulty as it is,—we have given the reasons,—may be of service. But it must never be more than a preliminary treatment for strabismus endowed with stereoscopic vision. Completion of cure demands diploscopic exercises.

When insufficiency is accompanied by marked deviation the greater number of oculists indicate operation as the best treatment. We have given our opinion on surgical intervention in such cases. In itself incapable of producing a cure, it gives a mere cosmetic result, and ought to be invariably followed by reeducatory exercises. Nor do we believe that the duration of this indispensable work is sensibly diminished by operation, for we have seen important divergent strabisms cured in less than ten treatments by the orthoptic method alone. Outside those cases where reeducation is impossible, one must never, as is often so mistakenly advised, operate at the first onset. A wisely conducted medical treatment will usually suffice, and the patient will gratefully avoid intervention that can, however, in case of necessity, be resorted to later.

We will rapidly sum up our usual course of treatment in the greater part of cases of divergent strabismus.

In the first place integral correction of the ametropia, no matter what the

degree, or how marked the difference in refraction between the two eyes.

If this correction is not sufficient to stop neutralization, and this happens frequently where the deviation is very marked, we try to revive diplopia. Many excellent means may be utilized to this end either simultaneously or separately. Diploscopic exercises, colored glasses, and different degrees of light will often suffice. In rebellious cases, prisms must be resorted to. We have employed 70 diopters of prisms, in the case of one of our patients (Dr. G—). Ordinary prisms may be used. Dr. Rémy's rules are most convenient, but the turning prisms of Landolt or Risley seem to us to be most favorable.

As to faults of insufficiency and convergence they ought to be opposed by exercises adapted to the type of the deviation, the enumeration of which would alone lead to unnecessary length. First experiences are often painful and trying (they brought on syncope in one case) but the patient quickly gets accustomed and interested in his progress, and given determination, the cure will be rapid and complete.

In conclusion, we wish to say a few words regarding two fairly frequent cases. Divergent strabismus frequently coexists with slight vertical deviation. Each time we have come across it, it has disappeared, with exercises, at the same time as the horizontal deviation.

The following observations concern certain pronounced squints due to considerable anisometropia. In an affection of this class (15 diopters of anisometropia and 22 degrees of divergent strabismus) we have been astonished that the patient, who had perfect binocular vision, with the diploscope, continued to see double in the street. We

had therefore to proceed to the re-education of peripheric binocular vision. We used Professor de Laperonne's perimeter with perfect results. The use of this instrument is certainly more practical than the mural method prescribed by Lagrange.

Such is briefly recapitulated the treatment that at present seems to us the best means of curing divergent strabismus; it is decidedly the most rational. Without doubt it demands a certain apprenticeship in the beginning and may on that account seem too lengthy. But a little experience and custom will rapidly bring about the discovery of a more rapid process and short cuts that will save precious time.

CONCLUSION.

Owing to its double nervous and optical origin convergent strabismus requires a treatment that is long and particularly delicate to establish, but in which reeducation of binocular vision is essential. Where possible this constitutes the preferable method, as well as the indispensable complement to surgical intervention. We ought to beware of the opinion of a great number of excellent oculists, who believe divergent strabismus can only be relieved by surgery. With a few reserves, we hold the contrary to be the truth, and it is chiefly in this case that orthoptic treatment gives the most rapid results and brilliant successes.

The first conditions of treatment are an exhaustive study of each case and a profound knowledge of facts. In spite of which, the not alone apparent, but true cure of strabismus frequently remains a very real difficulty; but this fact, far from discouraging us, ought rather serve to render us more exacting in the end to be attained and more severe in our choice of the right means with which to obtain it.

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METASTATIC INFILTRATION OF CORNEA (RING ABSCESS).

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Ring infiltration or abscess may arise from infected injury of the cornea or metastasis. This case followed very severe burns with infection, the eyes remaining without serious harm for a week. One was lost, the other retained some vision, probably because there was early rupture of Descemet's membrane.

The case, which is reported in this communication, is of interest because it evidently belongs to that class of serious corneal lesions, metastatic ring abscess, which fortunately are very rare.

Ring abscesses of the cornea seem to fall naturally into two distinct classes, those due to infection following wounds of the cornea, and those due to metastatic infection. Of the 22 reported cases, 11 followed accidental wounds of the cornea, 4 occurred after cataract extraction, and 7 have been regarded as metastatic. None of the early cases reported by Fuchs,¹ Collins² and Morax³ were metastatic. Of the reported cases in this latter class, Weiss⁴ case had a complicated fracture of the femur; Hirschberg's⁵ suppurative cystitis; Herrenheiser's and Winterstein's⁶ cases (referred to by Fuchs) puerperal septicemia; Axenfeld's⁷ case, cryptogenetic pyemia; and Giri's⁸ case, "Henoch's" purpura. Herbert⁹ reports a case of metastatic ring infiltration of both corneas in a case of severe septicemic plague. The case herewith reported is the eighth recorded case due to metastasis, the second in which both eyes were involved; and is very unusual in that there is not a complete loss of vision in one affected eye. The other was completely lost.

CASE REPORT.—V. P., male, 36 years of age, foreign born, was a strong, well developed, muscular laborer who had never had any illness that he could remember. On September 20, 1919, while carrying a bucket of live coals, he accidentally dumped the redhot coals into a pit of water which filled the pit with live steam. His entire body was burned by the steam, the deepest burns, which were of the third degree in some places, being about the feet, hands and face. The man was sent to the hospital and the burns were

dressed in the usual way with oil and wax. A mask was made which covered the face except eyes and nose. Both eyes were irrigated three times daily with boric acid solution. In neither eye was there very marked swelling of the conjunctiva, and both corneas remained perfectly clear for eight days. But a copious secretion from the conjunctival culs-de-sac was present after the third day.

September 29, nine days after the accident, the attending surgeon first noticed some haziness of the left cornea. Patient was first seen by the writer on the evening of this, the ninth day. The following conditions were noted at this time: In the left eye there was a yellowish gray sharply defined ring of infiltration about 2 mm. in width and 1½ mm. distant from the corneal limbus, concentric with it and extending almost completely around the cornea, being incomplete below for a distance of 3 or 4 mm. The lower parts of the infiltration area were slightly narrower than the upper, and were less distinctly outlined, the infiltration area appearing as a narrow crescent rather than as a ring. The peripheral margin of the infiltration area was very sharply defined, and the inner edges less clearly marked. Directly above in the area of infiltration there was a corneal ulcer 1x2 mm. with very clear cut edges involving a part of the corneal stroma. The center of the cornea and the peripheral ring of the cornea were perfectly clear. The aqueous appeared very muddy. The pupil was small, inactive and was filled with a slightly yellowish exudate. There was no hypopyon. On this date the right cornea was still perfectly clear. The ulcer was painted with tinctur of iodin, and hot fomentations, atropin and bichlorid ointment were ordered.

September 30: Fourteen hours later in the left eye the ulcer had extended

half way around the circumference and entirely thru the stroma. Descemet's membrane having prolapsed into the ulcerated groove for about one-third the circumference; and, directly above it, had ruptured, exposing the iris. The yellowish-gray ring had become complete below. The anterior chamber was now filled with a yellowish exudate and the entire center of the cornea was hazy.

Right eye now (14 hours after first examination) presented a gray, ring-like crescent above, extending one-third around the cornea, about $1\frac{1}{2}$ mm. from the limbus and concentric with it. Directly above, in the infiltrated area, there was a clear-cut ulcer $\frac{1}{2} \times 1\frac{1}{2}$ mm. extending deeply into the corneal stroma. Iris reacted sluggishly to light, and an exudate partly filled the pupil. The ulcer was thoroly painted with tinctur of iodin.

October 1: The area of necrosis, left eye, involved the entire ring area, the ulcer having extended completely around and thru the corneal stroma, giving it the appearance of the familiar deep, clear-cut, groove ulcer; Descemet's membrane only remained as a base or hinge for the ulcer below, the iris being the base above. There were signs of well developed panophthalmitis.

October 2: Of the left cornea there remained only a rather hazy peripheral ring 1 mm. in width. In the center of the globe there was a mass of necrotic tissue, iris and exudate. The conjunctiva was chemotic. At no time had the patient suffered much pain. The discharge was very profuse.

In the right eye the infiltration ring had extended about two-thirds around the cornea, being incomplete below. Above, the ulcer had spread one-third around and had penetrated to Descemet's membrane, which had prolapsed into it. The aqueous seemed quite clear as compared with the yellowish color of the left on the first day. The pupil was filled with a gelatinous looking exudate. Fearing that his eye would go the way of the left, heroic treatment seemed to be demanded, therefore cauterization with carbolic acid was decided upon. During the appli-

cation Descemet's membrane ruptured, evacuating the anterior chamber. This was not done intentionally. The usual treatment was then followed.

During the following three days the ulcer in the right eye did not spread perceptibly. The iris became the floor of the ulcer above, but the infiltration ring did not become complete. There was no hypopyon.

During the period September 29, October 1, 2, 3 and 4, the patient's temperature fluctuated between 102° and 103°F. His pulse was feeble, he was semidelirious (under opiate) and he seemed to be a very sick man. His recovery seemed unlikely. The temperature remained high (103°F.) and his general conditions seemed very precarious until October 9, when temperature suddenly fell to 100°. It became normal on October 13. The general condition of the patient showed marked daily betterment from this date.

October 3: The left eye was merely a mass of intermingled necrotic tissue, blood clot and pus. On account of the low state of the patient's general condition, the eye was not removed until November 4.

From *October 2 to the 9th*, the condition of the right eye showed very slight daily change. The ulcer did not extend, and the infiltration crescent or ring did not materially change. After the 9th there was noted daily improvement until the ulcer completely healed, the infiltration area becoming smaller daily, clearing at first from below. There finally resulted a dense leucomatous scar in the upper third of the cornea with an adherent iris; but there remained a fairly clear central area of the cornea, and a clear pupil, permitting a central visual acuity of 20/65.

DISCUSSION.—I feel that in this case the infection did not originate from a corneal wound, altho there must have been at least a superficial destruction of corneal epithelium. A clear cornea was noted by the attending physician for the first eight days following the burn. When the right eye was first seen by me, which was on the ninth day, it was very carefully examined, using a loupe and oblique illumination.

and it was found to be free from any ulceration, burn or abrasion.

The rapidity of the formation of the ring-like area of infiltration, concentric with the corneal limbus and $1\frac{1}{2}$ mm. from it, the yellowish-gray appearance of the infiltration, the rapidity of the corneal necrosis (the left cornea being completely destroyed in 36 hours), the presence of iridocyclitis prior to, or at least coincident with, the infiltration and ulceration, and the rapid total destruction of the entire eyeball from the ensuing panophthalmitis, are characteristics of "ring abscess" as described by Fuchs and others. The severe toxic condition of the patient, and his approach to general physical exhaustion undoubtedly reduced the vital resistance of the cornea and contributed to the necrotic process. The iridocyclitis was in all probability due either to endogenous toxins, or to a metastatic infection. Deep burns about his hands and feet were discharging pus freely at the time of the corneal involvement, and may most certainly be regarded as a very adequate focus from which bacteria or toxins might have been carried to his eyes. I am of the opinion that this case was due to metastasis and not to a primary corneal wound. Cyclitis was present at the time of the onset of the corneal ulceration.

The pathology of ring abscess has been studied by Fuchs,¹ Hanke¹⁰, Morax³ and Parsons.¹¹ No specific microorganism has been found, but streptococci, staphylococci and bacilli have been. Hanke describes a peculiar bacil-

lus which he claims as a cause, but not necessarily the specific cause. There are several theories advanced to explain the phenomenon of ring abscess. According to Fuchs, the bacteria which are responsible for ring abscess, altho they usually enter the eye by a perforating wound of the cornea, attack the cornea from behind, and set up a purulent iridocyclitis and keratitis. He pointed out that the area of infection is not in direct continuity with the wound, and presented some convincing evidence to show that the infiltration ring follows from the immigration of leucocytes from the peripheral vessels, these being directed toward the necrosed parts. Giri has advanced a different theory to explain the phenomenon of ring infiltration. He states that it is essentially a ring of infiltration neither to the wound nor to the necrotic cornea, but to the toxin pervaded area of the cornea.

In reviewing all the reported cases of ring abscess we find, in addition to the infected corneal wound or remote focus of infection, that there is almost invariably present a decided low vitality; and I believe that this is an important etiologic factor in the causation of infiltration ring abscess.

In the treatment I feel that in the right eye the early accidental rupture of Descemet's membrane, which reduced the intraocular tension, affording better drainage as well as better circulation, was a fortunate occurrence. In the future I would advocate an early free opening of the cornea in similar cases.

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FOREIGN BODY IMPACTED IN THE SCLERA AND RETINA, LOOS- ENED UNDER DIRECT OBSERVATION WITH OPHTHAL- MOSCOPE AND REMOVED.*

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In addition to a case referred to in the title and illustrated, one is mentioned in which the foreign body was loosened but proved nonmagnetic. An account of the first case of the kind reported by Haab is also included. Illustration is from a sketch by Dr. W. A. Cassidy.

V. N., male, age 21, consulted us July 30, 1919, with a history that while doing some emergency work on his car a piece of steel was driven from the shaft by a blow of a hammer, and

displacement of retinal pigment down and out, a few fine bright lines looking like small obliterated vessels running through this area. About 2.5 disc-breadths down and out from the

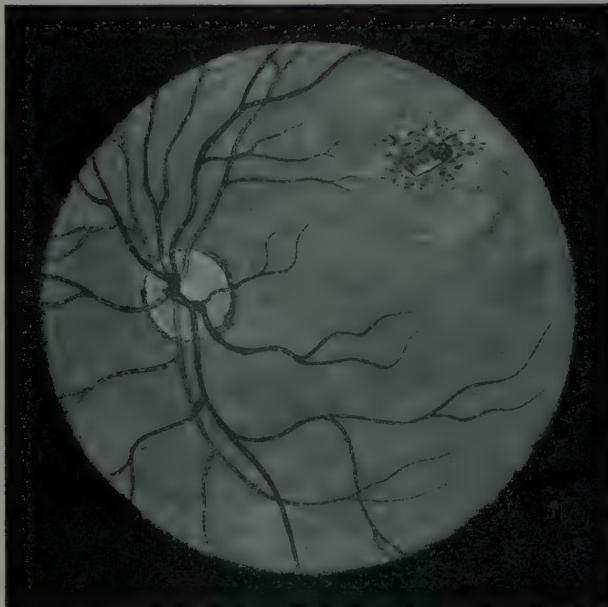


Fig. 1.—Bit of steel embedded in retina and sclera (Patton's case).

struck him in the right eye. For a few days the vision was somewhat impaired but this soon cleared up and he had no further trouble for about three months, when he noticed that his vision was slowly failing in that eye.

When he consulted us he had vision of counting fingers in the right eye and 20/15 in the left. Ophthalmoscopic examination showed the left eye normal. The right eye, pupil widely dilated, disc slightly indistinct, central retinal region somewhat blurry, some slight

disc, near the center of the area of displaced pigment, there was a large grayish brown mass, two or three diopters in height, rather rectangular in shape and having the appearance of an oxidizing metallic substance. The tension was normal and there was no discomfort.

As there was practically no question about the character of the foreign body, the giant magnet was tried repeatedly without result and with no change whatever in the appearance of the

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grayish mass. As the eye was apparently degenerating, due to the presence of the foreign body, on the suggestion of Dr. Gifford, I explained to the patient the possibility of loosening the foreign body by means of a knife or needle; and that while I might be able to remove the foreign body, it would entail a certain amount of risk so far as the eye was concerned. I also explained to him, that unless the foreign body was removed, the prognosis, so far as keeping the eye was concerned, was very poor.

He decided to try the operation, so after anesthetizing the eye and in addition injecting two or three drops of 10% cocaine solution just to the nasal side of the insertion of the inferior rectus muscle, I passed a Knapp knife needle down to the object and was much gratified in being able to detach it from its position in the sclera. I was surprised at the clearness with which I was able to follow the point of my knife and at the same time feel a grating sensation when it came in contact with the metallic substance. The foreign body was then easily drawn into the anterior chamber and removed thru a corneal incision in the usual way. The patient suffered no inconvenience whatever, altho there were a few fine stringy vitreous opacities seen a few days after the operation.

After several months the patient reported that the sight was gradually improving, there was no pain of any kind in the eye, and the pupil was practically normal in shape and size.

Haab reported the similar removal of an impacted foreign body some years ago, and as we were unable to locate the report, we wrote him and he was kind enough to send the following from the *Correspondenzblatt für Schweizer Aerzte*, 1898, p. 270:

"Finally a case was reported by Dr. Haab which gave occasion for a hitherto unused procedure which in certain cases may favorably assist a magnet operation. The author in the past September succeeding in removing a piece of iron which had remained since the previous January in the retina of a locksmith, and which, having been left

alone by the doctor who first saw the case, had meanwhile become healed in that position. He did this by means of a long cataract needle which he introduced into the globe from the side, loosening the foreign body and then drawing it out with the giant magnet. This somewhat difficult operation of loosening could only be carried out by looking into the eye with the ophthalmoscope at the same time, which made it possible to bring the point of the needle directly thru the vitreous up to the splinter. The splinter was situated about six millimeters in and up from the nerve. The eye, which was, as a result of the inflammatory changes which had occurred before the operation, entirely blind, gained by the operation no more useful vision, but was, however, rid of the splinter and the method might well be of good service in other more favorable cases."

I have made one other attempt to remove a piece of impacted iron from the retina and was able to dislodge it with the point of the Knapp needle but was unable to bring it forward with the magnet. Becoming suspicious after several attempts that the piece of metal might not be magnetic, I had the hammer from which it was supposed to have been thrown off tested with the magnet and found that it did not respond. But in this case I was able to guide the point of my needle very easily and could distinctly feel the grating when it touched the metallic substance. I have known of several attempts having been made to dislodge impacted foreign bodies and it is quite possible other cases have been reported but I have been unable to find them. I am sure that in cases where magnetic substances have become impacted in the retina, owing to the very unfavorable prognosis so far as the future of the eye is concerned, we are entirely justified in attempting this procedure.

Three things are essential; thorough cocaineization, wide dilatation of the pupil, and a knife needle with a sufficiently long shank so that there may be no trouble about reaching the foreign body.

GLAUCOMA AFTER CATARACT EXTRACTION.

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Three cases of glaucoma occurring after the extraction of cataract with iridectomy are here reported. The observations of previous writers upon this subject are cited and the essential character of the condition giving rise to it is discussed. Read by invitation before the Buffalo Ophthalmologic Club, January 13th, 1921.

It would seem that removal of the crystalline lens by combined extraction renders an eye less liable to increased intraocular tension. A considerable bulk of the internal structures of the eye has been removed (the lens and a portion of the iris) while the remaining iris occupies a plane posterior to its former position, where it rested on the anterior surface of the lens, thus deepening the anterior chamber.

I desire to report briefly three cases which have come to my attention within the past six months of increased intraocular tension secondary to combined cataract extractions.

That this sequel to successful extractions has occurred to others is evinced by occasional reports in literature. It is quite probable that in the past I failed to attribute to simple glaucoma the failing vision in aphakic eyes occasionally met with and which a change in lenses would not benefit, being content to regard it as due to simple senile atrophy of nerve and retina.

In this class of cases the perimeter is of no value as a diagnostic aid, since with the correcting lens worn the prismatic effect of the edge of the lens so narrows the field that the examination is totally unreliable, while without the lens worn the targets, unless they be of huge size, cannot be seen.

The ophthalmoscopic picture of the disc likewise is of little value as it is most difficult to recognize a cupping in the small image seen under these circumstances.

The diagnosis can be made with the tonometer alone and the history of failing vision in the simple chronic cases, and the usual history of sudden nauseating pain in the eyeball with the congestive picture in acute cases.

No reference will be made to glaucoma following occlusion of the pupil after cataract extraction. These observations are confined to successful

lens extractions with good vision, open pupils and quiet eyes for varying periods of time.

Case I. G. N. D., age 42, painter. Appeared May, 1909, with a history of having injured his left eye five days before while opening a can of paint with a chisel.

Examination revealed a cloudy lens with a dark triangular foreign body deeply embedded in the nucleus of the lens and a faint healed scar in the lower quadrant of the cornea. The right eye had been blind with a cataract for eight or nine years.

The left lens was extracted with iridectomy, recovering the small foreign body, which proved to be a chip from the chisel or hammer. The eye made an uneventful recovery with ultimate vision corrected of 6/6. The right lens was removed by combined extraction two months later, the eye requiring a discussion afterwards for a cloudy posterior capsule. The ultimate vision in the right eye was 6/20.

Not until August, 1920, more than ten years after the lens extraction, did the left or better eye give him any concern. He then appeared with a well marked bullous keratitis, tension 70 McLean and vision reduced to counting fingers at one foot. This condition had begun about three weeks before.

Miotics of considerable strength used for a week had no effect in reducing the tension, altho strongly contracting the pupil. The eye was then trephined at the lower limbus. A considerable amount of viscid fluid escaped thru the trephine opening. The eyeball became so flaccid on the table that the cornea was markedly indented. Strict injunctions were given to keep the head absolutely quiet for three days to safeguard as much as possible against the retina becoming detached. The eye was inspected on the third day; healing of the conjunc-

tival flap was satisfactory, the contour of the ball had returned and the bululous condition of the cornea had disappeared.

He was discharged three weeks afterwards with vision corrected of 6/20, tension 20 McLean. When last seen, December 7, 1920, the condition was practically the same.

Case II. F. E. S., merchant, a myope since childhood, who had never had better than 6/15 vision corrected. In February, 1919, at the age of 75, a combined extraction in the left eye resulted in vision of 6/7 corrected, which he enjoyed for a year and a half.

His wife's death, followed shortly afterwards by the death of his eldest son, gave his nervous system a tremendous shock. On August 4, 1920, vision was reduced to 6/15 and the tension of the eye was 38 McLean. As a supporting measure he was given tabloids mixed glands. Pilocarpin was used locally and improvement in vision and tension was apparent within a week. At the last visit, January 4, 1921, vision corrected = 6/7, tension 24 McLean.

Case III. Mrs. E. G., age 68, when combined extraction was performed upon her left eye, March 18, 1920. The operation and healing were uneventful with the exception that the anterior chamber was still open at the peak of the incision, three weeks after the operation. June 9, 1920, her correction was ordered; giving her vision of 6/9. This patient is totally deaf, a cripple from intracapsular fracture of the hip and lives in a rural district.

She was brought in July 15, reporting that a week before she had had severe pain in the operated eye and that she had lost her sight. Vision corrected = 6/60, tension 60 McLean. Eserin and pilocarpin solutions used alternately gave some relief, reducing the tension to 40 McLean, the vision improving to 6/30 corrected. Operative measures to reduce the tension were discussed and urged, but for one reason or another were deferred until December 8, 1920, when the patient appeared with tension of 60 McLean and vision reduced to counting fingers at one foot, despite the constant use of miotics.

The eye was trephined at the lower limbus and iridotomy performed. Healing was prompt and the result was ideal, the tension being reduced to 28 McLean. There is no improvement in vision, however; the disc viewed with the ophthalmoscope is chalky white.

Chance¹ has summed up the generally recorded experience regarding glaucoma following extraction, believing it to be rare. The late Dr. Risley in discussing Chance's paper reported the case of a patient who had been successfully operated upon by a simple extraction, leaving a round, mobile central pupil. In two weeks, after secondary capsulotomy, there was an attack of acute inflammatory glaucoma, Tn. + 2.

An iridectomy was performed and a viscid semifluid substance escaped thru the incision. Relief was prompt, vision rose to 6/9 and there was no recurrence. Dr. Risley believed that a paracentesis would have been sufficient in relieving the symptoms without an iridectomy, the spaces of Fontana having been blocked by the viscid contents of the anterior chamber, probably semifluid vitreous, which had come forward thru the rent in the posterior capsule. Risley reported at this meeting an additional case of secondary glaucoma following a combined extraction. The immediate result had been excellent, V=6/6. Seven years later he had an attack of pain in the eye with numerous recurrences of variable severity for six months. When finally examined in the clinic the eye was blind, Tn. + 2. The media were clear and a deep typical glaucomatous cupping of the disc could easily be demonstrated.

Akatsuka² found glaucoma after dissection of secondary cataract, which he explains by prolapse of vitreous into the anterior chamber and secondary closure of the sinus.

Bulson³ reported two cases of secondary glaucoma following combined extraction with large peripheral iridectomy at the 1907 meeting of the American Academy of Ophthalmology and Oto-Laryngology. Edward Jackson in discussion stated that he believed the secondary glaucoma to be due to an altered condition of the aqueous rather than to closure of the filtration

angle and that some operation intended to maintain drainage thru a fistulous opening under the conjunctiva seemed the rational procedure.

Lebensohn⁴ records a successful case of trephining for glaucoma following cataract extraction.

One of my cases was characterized by semifluid vitreous escaping thru the trephine opening and with the testimony given above I lean strongly toward the view that the vitreous closes the spaces of Fontana and is the chief causative factor in blocking the filtration angle. The vitreous, it will be remembered, consists of a clear liquid substance inclosed in the meshes of an equally transparent reticulum. It contains cells which have a varying shape, found particularly in its outer layers and which, according to Schwalbe, may be regarded as white blood corpuscles which have traveled into the vitreous. The vitreous, moreover, can readily become fluid as the result of disease of the adjacent membranes or as a simple senile change.

There may, however, be other reasons for its occurrence and it is probable that my third case was due to epithelial ingrowth. Collins⁵ enumerates the causes of the secondary glaucoma seen after cataract extractions as follows: (1) Epithelial cyst of the chamber; (2) iritis and keratitis punctata with changed character of the aqueous humor and blocking the spaces of Fon-

tana with inflammatory cells; (3) blocking of the angle of the chamber, brought about by adhesions of the lens capsule or of the anterior hyaloid membrane to the extraction cicatrix. Adhesions of the capsule to a limbal incision rarely cause glaucoma.

Elschnig⁶ reported a case in which severe glaucoma occurred within a month after leaving the hospital after the cataract extraction. The eye was enucleated and on microscopic examination it was found that the whole anterior chamber was lined with epithelial cells, which appeared to be an abnormal ingrowth from the anterior corneo-scleral surface. The epithelium covered the inner surface of the cornea, the anterior surface of the iris and even the remaining lens capsule.

Oatman⁷ subsequently reported an almost similar case in which the epithelial invasion followed an eversion of the flap.

Wootton⁸ met with glaucoma following combined extraction and due to the gradual ingrowth of the corneal epithelium into and lining the anterior chamber.

Lloyd⁹ makes the interesting statement that an elevated tension may be the real cause of delayed union. He reports failure to secure reduced tension after trephining over the opening of the original iridectomy. When a sclero-corneal trephining was done below success was immediate.

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CLINICAL OBSERVATIONS WITH THE SLIT LAMP OF GULL-STRAND.

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The increased usefulness of the corneal microscope thru use of the Nernst slit lamp to illuminate the eye affords many interesting observations of the minute structure of the cornea and iris. Some are here recorded with regard to corneal vessels, keratitis, iritis, and pigment deposits said to appear early in cases of glaucoma.

This valuable addition to the ophthalmic armamentarium is so new that but few observers recognize the pictures presented therewith and consequently these few observations may be of aid. A word regarding the instrument itself. A powerful electric lamp with but a single tightly coiled linear filament is enclosed in a light proof housing which has two rectilinear apertures. Thru these comes a beam of parallel rays the width of which may be varied. This beam is concentrated upon the eye by a focusing lens some 35 cm. from the source of light so that a true optical pencil of light rays, coming to as near a punctate focus as possible, is condensed upon the eye. The illuminated area is observed with the binocular Czapski microscope. The illumination may be of two types: either direct upon the area to be examined or thru the media behind the area, thus bringing out the area in dark field illumination.

New formed vessels within the cornea can be studied with great ease after some practice with the instrument and after some four or five minutes dark adaptation on the part of the observer. But little new has been added to our knowledge of the superficial vessels. However, the deeper vessels stand forth in an entirely different light, especially when viewed with the dark field illumination. They are numerous, far more so than any of the former methods of examination would lead to believe, and seem to be of the single endothelium type. The blood stream carried by the innumerable fine vessels consists of a single or double layer of red cells and progresses by pulsation. Between waves the vessel is partially empty and the walls seem collapsed. But there is no uniformity in the pulsation and it does not syn-

chronize exactly with the radial pulsation. One vessel may show its pulsation and its neighbor, less than one millimeter away, will pulsate at a slightly different rate and at a different time. This is probably due to the distance between the point of pulsation observed and the nearest communicating artery. A pulse wave that has to travel 3 mm. will not appear synchronous with a pulse wave that travels only 2 mm.

It has been claimed that each vessel continues in about the same corneal plane in which it enters the cornea. My observations do not substantiate that; for many vessels have been observed that dip deeper into the corneal stroma or become more superficial as they progress. But in no case do they approach very closely to the limiting membranes of the cornea. The course of the vessels may be very irregular. In a case of beginning interstitial keratitis, one vessel was observed that held a fairly straight course from the limbus toward the center of the cornea. About 3 mm. from the limbus another vessel approached it at a perfect right angle, but just before crossing, turned and became parallel to the first vessel for a short distance. The wanderer then turned away and dipped into a deeper corneal stratum. Very seldom does one vessel cross another in anywhere near the same corneal plane. It would seem as tho a vessel in the deeper cornea was surrounded by some denser tissue that an approaching vessel could not penetrate, but that turned the intruder into a parallel course. This denser tissue would seem to surround the vessels on all sides for quite some distance. Altho the course of two vessels may cross, it is usually in different corneal planes, seldom less than $\frac{1}{4}$ the thickness of the cornea

apart. Anastomoses of the deeper vessels may be seen near the center of the cornea, but grow fewer the nearer the limbus is approached.

New vessels make their appearance in the cornea much earlier than was formerly believed. A case of monocular interstitial keratitis presented the usual picture and had entered the retrogressive stage. The sound eye presented no indication of disease and did not cause the patient any annoyance whatever. One day the sound eye was examined with the slit lamp and on observing the cornea with dark field illumination, innumerable fine vessels were seen that had progressed almost to the center. No infiltration was visible nor could the vessels be seen by any other method of examination. About two weeks later, there was a faint ciliary injection and beginning deep infiltration of the cornea, which eventually developed into a true interstitial keratitis.

Iritis may be diagnosed with the slit lamp, at least 24 hours and frequently 60 hours before it can be recognized clinically. Any case with a suspicion of circumcorneal injection should be subjected to a careful slit lamp examination of the iris, for the hours thus saved may mean much in the prevention of posterior adhesions. A beginning iritis shows but little disturbance in the color of the iris, and a further development of the disease is usually essential to the presence of fibrin or white blood cells in the aqueous humor, or on the posterior surface of the cornea. But if the portion of the iris lying just peripheric to the sphincter muscle be examined under high power, a dilation of the blood vessels and a slight change in their color can be seen. The vessels seem to fill the individual

iris fibers completely so that but a thin bit of pigmented iris tissue separates the vessel from the anterior chamber. This is in marked contrast to the appearance of that portion of a normal iris, where the vessels are scarcely to be discerned. Later, as the disease develops and the iris tissue becomes swollen and its color altered by presence of exudate, this characteristic early appearance is lost, and the iris assumes the picture described by Koeppe and Vogt.

It has been claimed by Koeppe, and contradicted by Vogt, that incipient glaucoma (even a preglaucomatous stage) may be recognized with the slit lamp. The change consists in a peppering of the most superficial layers of the iris with very fine individual pigment granules (*Pigment Zerstreuung*): and this is claimed to be visible months or even a year before the disease can be recognized clinically. Further investigation and time will have to prove whether or not this finding is pathognomonic of glaucoma. But certain it is that in every case of glaucoma that I have examined with the slit lamp, the iris was peppered with discrete pigment granules. These are brown or black and are so small that they can just be seen plainly with medium magnification (20 diameters). They lie on the surface of the iris, apparently covered with endothelium, and extend into the depths of the iris crypts. The peripheric area of the iris contains the granules in the greatest profusion and here they have the appearance of having been sprinkled on to the surface from a fine pepper pot. Koeppe's contention as to the diagnostic value remains to be proven, but the presence of the granules cannot be disputed.

RADIUM APPLICATOR FOR CATARACTS.

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The methods and apparatus employed in using radium for the treatment of cataract are here described, in a way to assist other workers.

Since the publication of our paper on "Radium and Cataracts" (A. J. O., v. 3, p. 643) numerous inquiries have been received concerning the exact construc-

A piece of rubber dam is fastened below this plate with adhesive strips. This prevents the possibility of an injury from secondary rays, which in this

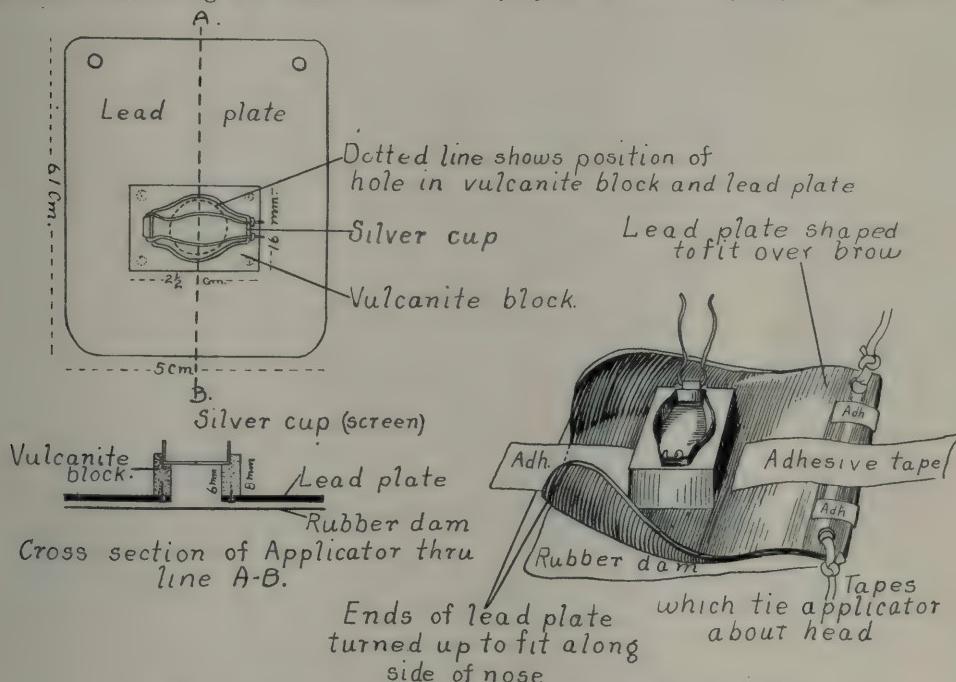


Fig. 1.—Radium applicator for cataracts. Diagram with explanation.

tion of the radium applicator. For that reason we are giving a more detailed account of the apparatus and the method of application.

Two main factors were borne in mind in the development of the applicator: (1) a simple method of applying the radium; (2) an apparatus which gave a constant distance and screening, and which guarded against the possibility of a burn.

The applicator consists of a specially designed silver cup with a bottom of 0.5 mm. in thickness, which screens out practically all but the gamma rays. The cup is embedded in a block of vulcanite at a distance of 0.6 cm. from the lead plate; the vulcanite block being attached by means of small screws.

apparatus would be given off by the lead plate.

The lead plate is 5 cm. by 6.1 cm. and made of 1 mm. lead sheeting. It is shaped to fit over the brow and along the side of the nose. (See sketch.)

A hole 0.8 cm. in diameter (the diameter of the radium plaque) is made directly under the position of the radium. The string tapes which hold the applicator to the head are tied thru two small holes at its upper end.

The vulcanite block is 25 mm. by 16 mm. and 8 mm. high. A depression is made to contain the silver cup, this being measured so that the cup is 0.6 cm. from the bottom of the block. A hole 0.8 cm. in diameter is made directly below the radium. A model of this block

is constructed from sheet dental wax and a dental laboratory readily makes a vulcanite one from it. This is now attached to the lead plate by means of small screws, which any optical concern can supply. The vulcanite has no value as a screen, but is used merely as a convenient method of obtaining a fixed distance.

The silver cup shown in the sketch is made to fit the type of radium applicator used. It can be fashioned by any manufacturing jeweler. The elongation at either end permits handling the radium with forceps. Care should be taken to have the bottom of the cup carefully measured to 0.5 mm., this being the screen for the radium. A simple spring catch keeps the radium in the cup. The cup is cemented into the vulcanite block in the depression made for that purpose.

In applying the applicator the patient is placed in the supine position. The lids of the eye under treatment are held closed by applying a small strip of surgeon's isinglass plaster over the cilia. A small gauze sponge is placed on the eye to prevent the apparatus from coming in contact with the skin. Over this gauze sponge the radium apparatus is placed, and held in position by two tapes tied around the head, and two small pieces of adhesive plaster to the brow and cheek, respectively. The patient is told to fix the ceiling with the uncovered eye, thus bringing the lens of the eye under treatment more directly under the radium. In this method the radium is approximately 1.2 cm. from the eye.

The matter of dosage is rather an uncertain one, varying with each type of radium applicator. A milligram hour is the exposure of one milligram of radium for one hour. The term gives a method of dosage for a given plaque of radium if the conditions of screening and distance are included. In most of our cases we have been giving 10 milligram hours twice a week for four weeks, and then once weekly until the process shows improvement. Following this, one exposure is given monthly for several months. Up to the present time there have been no cases that showed a retrogression. In

our private practice we have been using a 10-milligram plaque, which makes the time of exposure one hour. Where a stronger piece of radium is used, the time of exposure is reduced proportionately. For example, with a 20-milligram plaque the time would be reduced to half an hour.

When the radium emanations are used the apparatus is similar, with the exception of the silver cup, which is omitted. The emanations are screened with 0.5 mm. silver tubing. The tubes are held in place by means of wax. The dosage remains the same as in the radium plaque, being 10 millicurie hours; tubes of between 10 and 20 millicurie giving the most consistent results.

The results with cataracts continue to be consistent with those described in our previous paper.

We have used the same applicator in other ocular diseases, as tuberculosis of the conjunctiva, vernal catarrh, and certain obscure conjunctival and corneal lesions. Most of these have shown a decided improvement.

In private practice we continue to use the radium plaque, but employ the emanations in the clinic. The results do not differ, whether the emanations or the plaque are applied.

In cataracts which have gone to the immature stage; in other words, where the vision has been reduced to .2, the method is not indicated. In several of the inquiries concerning the treatment for cataracts, the process had apparently gone to the immature or mature stage. Experience has shown that they respond poorly to the treatment. The best results are obtained in those cases which can be classified as incipient, and where the vision has not been reduced below 0.5. In checking up we find that after the radium treatment there is generally a change in the refraction.

This paper has been presented with the hope of thus stimulating more men to use radium, trusting to obtain a better knowledge of the results thru widespread application.

Cases must be carefully selected and the details of treatment strictly adhered to.

OCULAR CONDITIONS ASSOCIATED WITH ARTHRITIS DEFORMANS.

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Altho ocular complications have been described as associated with rheumatism it is only of recent years that their connection with arthritis deformans has been fully recognized. This paper reports four cases and refers to the mention of similar cases in the literature. Read before the Ophthalmic Section of the Medical and Chirurgical Faculty of Maryland, March 9th, 1921.

Arthritic ophthalmia was a term much used by ophthalmic writers a hundred years ago. It embraced very varied conditions, as purulent conjunctivitis, iritis, glaucoma. Mackenzie¹ applied it to certain forms of iritis due to gout. Much confusion arose and has continued until recent times, because every variety of articular disease that was not clearly gout was described under the term of "rheumatism."

The extensive studies of Jonathan Hutchinson² embodied in his several papers on the "Eye Diseases in Gout and Rheumatism" suffer from this fact, as does likewise Nettleship's paper³ on the "Frequency of Rheumatism and Syphilis" as causes of iritis. Out of a total of 71 cases he ascribed 30 to syphilis, 23 to arthritis.

"Scleritis, iritis and conjunctivitis have been described as complications of rheumatoid arthritis, but it is doubtful whether they are really manifestations of this disease. Their occurrence would suggest that a gonococcal infection is responsible for both the arthritic and the ocular lesions." This citation, taken from Allbutt and Rolleston's System,⁴ shows a more generous consideration of the eye complications of arthritis deformans than is commonly to be found in the works dealing with this subject. Llewellyn Jones,⁵ in his recent work on arthritis deformans, summarizes the eye complications in almost the same words. He also mentions a peculiar contraction of the fields of vision; which he attributes to vasomotor disturbances, because it is influenced by amyl nitrit. See also Beaumont.⁶

The voluminous studies on arthritis deformans by the "Committee for the Study of Special Diseases"⁷ do not make mention of ocular complications.

Books dealing with the relation of ocular and systemic diseases likewise furnish scant information. Berger⁸ has a chapter on "Trouble oculaires dans les affections des articulations"; but mentions nothing bearing on arthritis deformans; nor does he refer to this disease in his contribution to the *Encyclopedie Francaise d'Ophthalmologie*. Kries,⁹ writing on "Chronic Rheumatism," says, that while this has been looked upon as the cause of the most varied diseases of the eye, this assumption holds good only for certain forms of uveitis, iritis, glaucoma and scleritis. Schmidt-Rimpler,¹⁰ in Nothnagel's System, embraces all chronic cases under "chronic rheumatism" and refers to iritis, interstitial keratitis, scleritis, tenonitis and retrobulbar neuritis. Groenouw¹¹ devotes a chapter to the diseases of the articulations (and the muscles) and collects more than forty references bearing on the subject, reaching down to 1900; but not a single one dealing specially with arthritis deformans. Arnold Knapp,¹² in his "Medical Ophthalmology," does not mention arthritis deformans.

The pages of medical literature are filled with the subjects of gout and rheumatism and these conditions are constantly regarded as the causes of iritis, scleritis and many other ocular diseases. The causative relation between arthritis deformans and iritis is now generally recognized. It is accepted as a fact in our leading textbooks.¹³⁻¹⁴ But the number of cases well studied and sifted, is not abundant. Gilbert¹⁵ recently reported two typical cases. See also Junius¹⁶ "Rare Rheumatoid Affections with Ocular Disease."

In this paper the writer ventures to report conditions other than iritis met

with in association with typical arthritis deformans.

CASE 1. Miss G. had been a sufferer from arthritis deformans since she was fifteen years old. In 1908, when she was thirty-eight, she was under the care of Dr. Baer at the Hopkins Hospital, and I am indebted to him for the following: Father's sister had rheumatism. Patient's general health good. Had measles, typhoid, no tonsillitis. Articular disease began in left shoulder, then left elbow and wrist, followed by ankles, knees and joints of

Blood: RBC. 4,160,000; WBC. 7,200; Hg. 8 25%; Polys. 75%.

Urine: Sp. Gr. 1015-1035. No sugar, albumin or casts.

Course in hospital. Ran fever to 100° in evenings, gradually subsiding to normal. Some relative tachycardia. Patient kept at rest. Joints baked Aspirin grs. x t.i.d. Gradual improvement. Discharged after four months.

I was called to see this patient December 7, 1911. Her general condition had been inflamed for several weeks. Both eyes presented a mild scleritis.

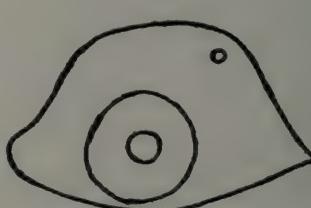
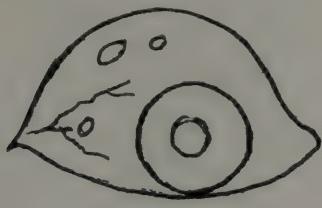


Fig. 1.—Spots of scleritis seen in arthritis deformans. Case I.

right arm, and later hips. Had been in bed for one year. Never free from pain since first attack. Temperature 99.6°, pulse 120. B. P. 110/80. Patient sallow and pale. Exophthalmos, but no von Graefe sign. "Geographical tongue"; few crackles at apices of both lungs; heart clear; spleen enlarged. Almost all the joints of the extremities involved, with pain, crepitus and limitation of motion. Marked muscular atrophy; ulnar deflection of fingers.

Special note of Dr. Baer's: Great amount of atrophy of muscles of hand, with swelling in region of joints. Certain amount of villous changes in and about joints, with loss of some cartilages, causing grating. Hyperextension of distal phalangeal joints and atrophy. Marked dislocation of first and second fingers of right hand. Knees swollen and dislocated backwards, with increased lateral motion. No villi to be felt in knee joints. Elbows flexed and cannot be supinated; marked grating. Teeth bad. Tonsils and throat clear.

The eye-grounds were healthy and vision was unimpaired. Aspirin in 5-grain doses and dionin in 1% solution locally were ordered.

This condition continued with periods of improvement and of exacerbation. On April 5, 1912, I found both eyes still markedly congested in patches, with areas showing the characteristic purplish hue consequent upon scleritis. In addition, small, flat, yellowish, white masses were to be seen in the bulbar conjunctiva; there was but one in the left eye, some distance above the cornea; in the right eye there were several in the upper quadrant, and they were larger. They were but slightly prominent. (See Fig. 1.) These spots were apparently of the same nature as those that have been described as occurring in gouty scleritis, and regarded as deposits of uric acid.¹⁷

The patient was suffering much pain and was taking about 25 or 30 grains of aspirin daily. I saw the patient again in January, 1913, when she complained that she had severe pains in

her head from time to time, and at such times the eyes became congested and inflamed. At these times she took aspirin with relief. At the time of my visit the eyes were free from congestion, and showing only the purplish discoloration of the sclera.

The patient lived until February, 1920, when she died of myocardial degeneration. She had not been troubled with her eyes for several years.

Rohmer¹⁸ regards scleritis as the expression of a diathesis which he calls "arthritism," and due to an exudate similar to the deposits in the articulations. The distinct deposits observed in this case are in accord with this view.

CASE 2. Miss H. began to suffer with her joints in 1872, when she was thirteen years old. At first her feet swelled and she had difficulty in walking. Soon after, the knees became involved and became fixed in a flexed position. She has never been able to walk since that time, but after about a year spent in bed, her pain subsided and she was free from suffering for twenty-three years. About 1895 other joints became involved, from the shoulders to the finger joints. She was repeatedly examined most carefully without the discovery of any focus of infection. In 1915 she spent a week at one of our leading hospitals for examination, again without result. She had always enjoyed good health, barring the arthritis and several attacks of kidney colic, from which latter trouble she was finally relieved by an operation on the kidney about 1912.

My first examination of the eyes was May 13, 1915. For several weeks she had been annoyed by a sensation of grit, and during the past two days there had been pain in the left eye. I found a small superficial corneal ulcer, not infiltrated, about 1 or 1.5 mm. near the inner margin of the cornea. The eye was only moderately congested. Iodoform ointment was applied and the ulcer disappeared in a few days.

October 11, 1915, there was a fresh ulcer of the same kind near the inner lower margin of the same cornea, which took the same course. February 18, 1916, a similar ulcer near the

outer lower margin, requiring about a week for its recovery. There were recurrences which I observed in March and again in April, 1917, October, 1918, April, 1919, and October, 1920, affecting the eyes indiscriminately, besides several attacks which I did not see. The duration varied from a couple of days to a week. The ulcers disappeared without leaving any trace. The patient, a very intelligent woman, is of the opinion that the ulcers appear when she "is not feeling well," when she "is run down." But it must be borne in mind that her "best condition" is one of considerable suffering, for there is scarcely an articulation in her entire body which is not involved in the pathologic process. The ulcers have all been of about the same size and have all been situated one or two mm. from the corneal margin. They are of the characteristic variety described as "small marginal ulcer," by Fuchs¹⁹ and which he attributes to the "uratic diatheses." It should be specially noted that the patient does not suffer from any nasal trouble, not even a "cold," at the time of the corneal attacks, and there has never been any inflammation of the conjunctiva.

CASE 3. Mrs. K. dates the onset of her arthritis deformans to the birth of a child when she was twenty-three years old. It began in the hands, gradually invaded the shoulders, legs and she soon became unable to walk. Her hands, arms and legs present the characteristic deformity.

She first consulted me in January, 1908, when she was forty-two years of age. She complained of inability to use her eyes. There was a marked chronic conjunctivitis, with masses of stringy mucus. The photophobia was so intense that it was impossible to make an ophthalmoscopic examination. Her vision was:

$$\begin{array}{ll} \text{R.} & -0.5\text{--}1.5\text{c. } 160^\circ = 6/9. \\ \text{L.} & -1.5\text{--}2.0\text{c } 15^\circ = 6/12. \end{array}$$

Dionin and hot boric acid applications were used. In November, 1911, I was called because the eyes had become very painful, and found ulcers near the lower margin in both cornea. The ulcers were superficial, crescentic in form, and concentric with the corneal

limbus, from which they were separated by a narrow band of healthy tissue. In the right eye the ulcer was 6 to 8 mm. in length, in the left 4 to 5 mm. and about 1 to 2 in width. Several weeks elapsed before the ulcers cleared up, leaving shallow depressions.

On January 24, 1912, a test of vision gave the following:

R. — 3.5 c. ax. 7° = 20/24.

L. — 1.5 C — 2.5 c. ax. 15° = 20/30.

Both eyes were very irritated, and there was much thick stringy mucus. She was using a zinc collyrium. The patient was not seen again until recently. September 24, 1920, she reported that she had frequently had attacks of painful inflammation in both eyes, first in one then in the other, during the past eight or nine years. But in the intervals she had been able to read. This, however, she had been unable to do for six months.

Both eyes were found much congested and the photophobia was intense. The corneae are fairly clear, tho there are a number of maculae. The palpebral conjunctiva is very red and there are bits of threadlike mucus in both eyes. An ophthalmoscopic examination is impossible on account of the photophobia, but the ophthalmoscopic reflexes are clear. Vision with her distant glasses is R. 20/150, L., less. Various collyria and ointments have been used with little relief.

In this case we have a persistent conjunctivitis with tendency to corneal involvement and with the development at one period of "superficial marginal ulcers" in both corneae.

The corneal affection in this case clearly belongs to the variety described as "catarrhal ulcers," and appears to be secondary to the persistent conjunctival inflammation.

CASE 4. Mrs. S. enjoyed good health, barring her arthritis deformans, which began in 1909, when she was 61 years of age. At that time severe pains set in, in the knees, feet and soon after in the wrists. She has suffered pain more or less continually since that time. She was able to walk for some time but not for the past six years. The knees

are flexed and fixed, and the hands and wrists show the typical deformity.

I first saw the patient in November, 1918. At that time there was no inflammation of the eyes nor had the patient complained of them in any way. The eye-grounds were healthy and the vision was good. On April 16, 1920, I was called because she was suffering discomfort in her left eye. I found the eye somewhat congested and an extensive denuded area along the lower edge of the cornea. An ointment containing iodoform and holocain was ordered. But the condition gradually became worse, and the pain increased to such a degree that she could get relief only by the help of morphia.

On May 4 the condition was that of a dense gray infiltrate at the lower margin of the cornea in the shape of a broad and intensified arcus senilis. Pain severe. Argyrol and atropin were being used. There appeared to be no tendency to extension, but the ulcer resisted treatment. The denuded area was stained by argyrol. May 7 a few posterior synechiae became evident.

The inflammation gradually abated; scarlet red ointment was then used; about the end of May the patient had recovered sufficiently to leave the city for her country home and had no further trouble with her eye.

I examined the eye on October 4, 1920, and found an extensive corneal opacity shaped like a hypopyon of 2 or 3 mm.; depth, but no other trouble. The eye-grounds were normal and sight was almost normal after correction of a marked inverse astigmatism (2 D). During the summer the patient has had several attacks of angina pectoris; but when last seen, in the fall, she was in her usual condition of health. The patient died January 18, 1921.

The corneal ulcer described in this case belongs to the variety of "superficial marginal ulcer" of Fuchs.²⁰

Fuchs says interstitial keratitis was formerly regarded as rheumatic, until Hutchinson²¹ showed its luetic basis. Hansell²² in 1903 reported two cases of keratitis, one of the lattice-work variety, the other of the "superficial punctate" as "probably rheumatic in ori-

gin," but the history given does not substantiate this.

In 1905 Leartus Connor²³ published "Is Keratitis Ever Caused by Rheumatism?" He reported several cases and the results of an inquiry addressed to American oculists. There were records of a great variety of interstitial keratitis (46) and of superficial keratitis (13); among the latter four cases of marginal keratitis, one of which was observed by Connor in a case of "subacute rheumatism."

Arthritis deformans is now commonly regarded as a chronic infection. Osler²⁴ said: "This view is steadily gaining ground and the evidence suggests certain varieties of streptococci

as the causal organism. The arthritis is secondary to a focus of infection somewhere"

The ocular complications described in the four cases narrated, scleritis in one, marginal ulcers in the other three, associated in one with a chronic and stubborn conjunctivitis, may be explained upon the basis of the view just described. Further observations are needed to make sure that these eye conditions are dependent on the constitutional condition and not coincident. For the present we must admit that we have not solved the problem, and may still say with Mackenzie, "I must confess that the nature of arthritic ophthalmia is unknown to me."

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EXTREME HYPERMETROPIA.

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A case of 17 D. hyperopia in each eye is here reported, with reference to some of the similar cases found in the literature. The report was presented to the Louisville Eye and Ear Society, February 9th, 1921.

The infrequency of excessive hypermetropia warrants the report of the following case of hypermetropia of 17 D.

Miss H., age 38, consulted me in November, 1920, with the history of having worn glasses for poor vision since her ninth year; that she had to change her lenses frequently until 10 years ago, and that since then she has worn the same glasses with comfort. In the last few months she had noticed more difficulty in reading and sewing, and had acquired the habit of holding her glasses four inches from her eyes or dropping them to near the tip of the nose to make objects clear. She had also had occasional attacks of nausea, but gave no history of headache or other symptoms of asthenopia. Vision had always been defective but the patient has been able to attend school and secure a fair education and to do a moderate amount of reading and sewing. There was no history of squint. Patient was wearing for both eyes, + 17 D. for near and far use.

Both parents of the patient have good eyes and began wearing reading glasses when past 40 years. There are two brothers and three sisters, only one of whom is wearing glasses (1.5 D. hypermetropia absolute). One sister is blind, the result of optic atrophy.

Examination of patient showed no abnormality of face, with the possible exception of an unusual prominence of the frontal eminences. The interpalpebral aperture seemed normal. In lifting the lids two very small eyeballs presented. Being uniformly small, they gave the impression of doll eyes. Corneal diameter measured 11 mm. There was no abnormality of iris or choroid. The optic nerve, so far as could be determined, was also normal. Retinoscopy, altho not very satisfactory, read about 17 D. hypermetropia. Ophthalmometer showed corneal curve greatest in horizontal meridian (0.5 D. against the rule, axis 180°-90°).

Subjective examination: R. Fingers at four feet, improved with + 17.0 D. sphere to 20/100. No improvement with cylinders. L. Fingers at 8 feet with +17.0 D. With both eyes she was able to read Jaeger No. 5 from 15 to 22 cm. with +19.0 D.

Altho it is generally understood that there are three types of typical hypermetropia, those of a low, of a moderate and of a high degree—a sharp line of division based upon the amount of refractive errors has not been made. Landolt¹ in his classic work on Refraction and Accommodation of the Eye (1886) made a division of the hypermetropic cases into three classes; which he based upon the formation of the head and face, rather than upon the degree of refractive error present. He pointed out that in the cases of a low degree the arrest of facial development is scarcely perceptible, and that the individuals nearly all have normal acuteness of vision and range of accommodation.

The cases of a medium degree are easily recognizable by the conformation of the cranium and face. The face appears flattened, especially in the region of the root of the nose, the forehead, the orbital borders and the zygomatic processes. The eyes in this class of cases are usually small, the development being more especially retarded in the anteroposterior diameter, causing an axial hypermetropia. The visual acuteness in the cases of moderate hypermetropia may be perfect, but in a large percentage of cases the vision is somewhat defective. There is an insufficiency of accommodation for near objects which makes itself more felt as the degree of hypermetropia is higher. It is in this class of cases that the hypermetropia is frequently associated with convergent squint, owing to the constant effort at accommodation and convergence.

Landolt speaks of the imprint of the arrest of development that nearly all

individuals with high degrees of hypermetropia bear. The eyeball is reduced in size in all of its proportions, while the retarded development of the face is in keeping with the underdevelopment of the eye itself. The eyes resemble those cases of microphthalmus associated with coloboma of the iris or choroid, and of congenital atrophy of the nerve, with little or no vision.

Vision in the cases of high degree hypermetropia is always subnormal. An unlooked for feature of the cases is the underdevelopment of the ciliary muscles and consequent restricted range of accommodation, rather than an overdevelopment as might be expected. This underdevelopment of accommodation has been explained in a realization on the part of the individual of his inability to accommodate sufficiently to overcome the high degree of ametropia and a consequent lack of effort.

This absence of accommodative efforts accounts for the infrequency of convergent squint, another unlooked for feature of these cases. Convergent squint is very exceptional in cases of excessive hypermetropia; in fact these cases, especially those in which a high degree of amblyopia prevails, are not infrequently associated with divergence. They not only resemble cases of high myopia in this particular but also in that the individual holds print very close in reading. As the retinal images are very small in excessive hypermetropia, patients bring objects very close to the eye in order to obtain larger tho less distinct retinal images.

Cases of extreme hypermetropia are quite uncommon as is evidenced in the infrequency of case reports of the kind. My records contain but two other cases of the kind, one of 10 D. and one of 12 D. hypermetropia. In a paper

read before the Ophthalmological Society of Heidelberg in 1906, Leber² called attention to the rarity of the condition and cited from his own records 8000 cases of refraction, among which hypermetropia of more than 11 D. was observed but four times.

High degree cases were noted even in Donders' time, for he cites³ a case in which glasses of about 21 D. were prescribed for distance. From that time until the present, case reports of extreme hypermetropia have appeared from time to time, among them one of 24 D. hypermetropia reported by Seabrook.⁴

Edw. Stieren⁵ reported a case occurring in a feeble-minded boy of 15 years, who had a microphthalmus with no vision in one eye, and a hypermetropia of 21 D. with imperfect vision in the other. Similar cases with lower degrees of ametropia were reported by Bishop Harman⁶ of 18 D. Chavasse⁷ of 18 D., Clausen⁸ of 15 D., and Lafon⁹ of 15 D.

Reports seem to indicate that several members of a family frequently have similar high degree of ametropia. J. A. Wilson¹⁰ reported three children among five of a family in which one had a manifest hypermetropia, right 14 D., left 16 D.; another right 10 D., left 12 D. and another right 8 D., left 9 D. He also cites two cases in one family, one with 12 D., the other with 9 D. hypermetropia.

The observation has been made that refractive errors frequently correspond in kind and degree to the degree and kind of ametropia of the parent—in fact that like errors extend thru several generations. As an illustration, may be mentioned a case reported by Dodd¹¹ of a father with hypermetropia of 15 D. whose son had an absolute hypermetropia of 14 D.

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OBJECTIVE AND SUBJECTIVE TREMORS AS FUNCTIONAL DISORDERS DUE TO EYESTRAIN.*

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Tremors demonstrable to sight and touch, "objective," are frequently due to eyestrain. Less frequent are peculiar sensations of quivering or trembling, not objectively demonstrable, but "subjective." A table of cases illustrates the symptoms described and results obtained by correcting errors of refraction.

Tremors, as other symptoms due to eyestrain, find their pathologic explanation on anatomic grounds. Of the twelve pairs of nerves, the second, third, fourth, fifth and sixth, go in whole or part to supply the eye, besides the ophthalmic division of the great sympathetic nervous system. The two great gangliaed cords extending the whole length of the vertebral column are abundantly connected thru afferent and efferent nerve fibers with the cranial and spinal nervous systems. Thru the ganglia and plexuses the sympathetic relations between the different organs are maintained, and thru it the control of the vasomotor, trophic and secretory activities of the viscera as well as of the involuntary muscles is regulated.

We can, therefore, easily understand the most unexpected results of continued eyestrain and the frequently surprising cures effected by proper refraction. The subject of tremors as due to eyestrain has so far been almost entirely neglected by the medical profession. Text-books on general medicine, nervous diseases and refraction do not mention it. Not even S. Stephenson in his careful monograph on eyestrain seems to have heard of it. The only reference that tremors may be due to eyestrain, I find in the following few sentences quoted from letters of his patients by Dr. Geo. M. Gould in the 6th volume of his Biographic Clinics:

"I even note that such an unimportant matter as a nervous trembling of the hands, which has made writing and sewing difficult for many years, had entirely disappeared."

"After wearing my old glasses for six weeks my hands began to tremble. I remember this because I had a sewing girl and could not help her be-

cause I was unable to thread or set a needle. After a while I began to shake all over and could not take much exercise. Walking did not seem to trouble me, tho the flesh quivered all over my body most of the time."

"In passing it may be noted that the tremors of many kinds and afflicting many patients are often, in essential nature, probably an excessive and unregulated overflow of innervation to the bodily muscles."

OBJECTIVE TREMORS.

These tremors of the voluntary muscles are absolutely visible and demonstrable to touch. I therefore wish to call them *objective tremors* to distinguish them from another class of cases, to my knowledge never before described, which gives the history of a peculiar sensation that is felt as a trembling of the smooth muscles, in the viscera and also, tho rarely, in the voluntary muscles. This trembling is *not visible nor demonstrable to the touch*, and is purely a sensation. I have therefore called this sensation of trembling *subjective tremors*. As I said, it is not a tremor, but bears only a sensory resemblance to it. It is comparable to a polar light or a sunset simulating the appearance of a distant actual conflagration.

The exact localization of the centers which when irritated cause these tremors, is as yet theoretic. While the objective tremors are undoubtedly caused by the stimulation of the cranial motor centers, the latter play none or only a secondary role in the causation of subjective tremors. The localization of subjective tremor centers is, in all probability, in the sympathetic ganglia or plexuses, supplying the smooth muscle fibers, especially those of the arterioles. It is the spasmodic

*Read before the Maimonides Medical Society of Detroit, Mich.

contractions and dilations of the latter, not noticeable by touch nor able to be stopped by direct pressure, which in all probability produce the sensation of quivering in subjective tremors.

Objective tremors of eyestrain origin never occur without other accompanying symptoms. They are either slow or moderate, fine or coarse, and usually volitional. They are never organic, but always functional. The parts most frequently involved are the hands and arms, next in frequency are the legs, and occasionally other sets of muscles as the chin, tongue, cheeks, spine muscles and so on. The tremors are as a rule so slight that they are easily overlooked and never complained of except on direct inquiry. They are rather more common in women than in men (359 to 288) and occur at the age of 20 to 60.

The results of refraction in the elimination of this annoying symptom are very gratifying, more so in women than in men. Of the 647 cases there were:

	Improved	No Reported or Cured	Improvement
Men	288	126	109
Women	359	172	154

17 18

Therefore refraction can be credited with beneficially influencing functional objective tremors in 85% of the cases in men and 90% in women.

CASE REPORTS.

I shall cite only a few of the many cases of objective tremors, which the results of refraction prove to have been caused by eyestrain.

1. City official, 43 years of age, occasional tremors of the hands, bad enough to prevent him from writing during the attacks, lasting about ten minutes.
2. Office clerk, 20 years of age, tremors of whole body, with attacks of headache.
3. Laborer, 29 years of age, tremors of hands since youth.
4. Machinist, 34 years of age, tremors of the legs and spine muscles, variable in location and duration. Tremors of left upper lid when reading.

5. Clerk, 31 years, occasional tremors of hands, also tremors of the whole body lasting five or ten minutes, accompanied by chills.

All of these cases reported perfect recoveries.

SUBJECTIVE TREMORS.

Of greater interest, from a medical standpoint at least, are the cases suffering from subjective tremors. During the last six years I was able to collect only 92 cases, which would be about two or three per cent of all my cases seen during that length of time. The women were seven times more subject to that peculiar condition than the men (81 to 11.) The diagnosis is simple and the prognosis favorable.

Of the 92 cases, I saw again, some time after refraction, three men and forty-one women. All of them recovered except one woman patient.

The ages of the subjective tremor patients were the same as for objective tremors, anywhere from 20 to 60. The age limit of 60 is explainable by the fact that as the accommodative efforts cease, the eyestrain symptoms also disappear. The attacks last anywhere from a few seconds to two or three days, recurring at indefinite intervals. Excitement and fears invariably produce a recurrence of the attacks. The first attacks usually frighten the patients, but after getting more or less used to them, they are complained of as only annoying. Subjective tremors are absolutely painless and may or may not be accompanied by objective tremors.

As there is no organic lesion of any kind in subjective tremors and the irritation of the nerve centers probably not as severe as in objective tremors, the results are naturally more favorable.

As this is the first report given to the medical profession on subjective tremors, I take the liberty to include the records of my cases, as far as this symptom is concerned. I have tried to use, wherever possible, the exact descriptions given by the patients themselves.

Table I. Men Who Did Not Subsequently Report.

No.	Age	Occupation	
1	45	Physician	Objective tremors of hands. Subjective tremors in chest.
2	47	Physician	Objective tremors of hands and body. Subjective tremors in chest and abdomen.
3	44	Laborer	Subjective tremors in chest.
4	25	Watchman	Objective tremors of hands and whole body. Subjective tremors in chest, arms, and muscles, especially when going to bed. "Tremors not visible." "Takes twenty minutes to get over it, returning next night, sometimes not for a week."
5	38	Carpenter	Subjective tremors in head.
6	30	Dealer	Subjective tremors, precordial.
7	32	Merchant	Subjective tremors in legs.
8	23	Workman	Subjective tremors in stomach, on excitement, lasting one or two minutes. The feeling was annoying but not terrifying. On Sundays or in periods of relaxation would not be bothered.

Table II. Men Who Reported the Result.

No.	Age	Occupation	Results of Refraction	
1	33	Machinist	Recovered	Subjective tremors in chest.
2	21	Druggist	Recovered	Subjective tremors in chest, daily, mornings only, lasting to 11 or 12 noon, seldom in the afternoon. Began last year.
3	29	Toolmkr.	Recovered	"Quivering, not visible, in body, chest and abdomen, but visible in hands" (objective tremors). It would come on every two or three days, mostly after hard work, lasting about one-half hour two or three times a day. If he sat down and relaxed it would ease up. It all lasted three years.

Table III. Women Who Did Not Report.

No.	Age	Occupation	
1	22	Bookk'pr.	"Trembles and shakes inwardly terribly, but no one can see it." When excited, jerks, twists and jumps at the least noise. Objective tremors of hands.
2	38	Bookk'pr.	Objective tremors of hands and legs, quite often. "Trembling inside" in chest.
3	27	Wife	Tremors of whole body. During the "shaking" she feels quite warm; she does not feel very ill but uncomfortable. "She really does not shake but feels as if she were shaking."
4	25	Wife	"Trembly inside," with hot flushes once a month lasting three or four days.
5	25	Wife	Objective tremors of hands. "Inside trembling in stomach."
6	21	Office	Objective tremors of hands and body. "Inside trembling in whole body."
7	29	Wife	Objective tremors of hands and body. "Inside trembling" in chest and abdomen.
8	20	Wife	Objective tremors of hands and body, at times. Subjective tremors every few days.
9	31	Wife	Objective tremors of hands, and subjective tremors in chest.
10	26	Bookk'pr.	Objective tremors of hands and body lasting one-half hour. Subjective tremors in abdomen.

11	21	Switchb'rd.	Objective tremors and trembling lasting one to two hours and subjective tremors in abdomen before falling asleep.
12	49	Wife	Subjective tremors in abdomen.
13	25	Teacher	Subjective tremors in chest for last two years.
14	34	Wife	Subjective tremors in chest when talking much or when excited, lasts only a few seconds. She then presses her hand to her heart to quiet it, as she says. This subjective tremor is not terrifying to her, but just uncomfortable.
15	34	Wife	Subjective tremors in chest. Rarely. Does not feel very ill, but feels relieved when they pass.
16	22	Stenog.	"It seems to tremble inside of her chest. It feels as if she were all cold inside and the voice is then trembling." Lasts less than half an hour, recurring on excitement about once a week. Not terrifying but annoying.
17	37	Wife	Subjective tremors in stomach when lying down, especially after taking a meal. Sensation usually lasts about two or three hours on an empty stomach, otherwise very much longer. It occurs nearly daily, especially when tired.
18	54	Wife	Subjective tremors in back and in muscles. "Quivery feeling."
19	45	Wife	Subjective tremors in stomach especially at the time of menstruation.
20	34	Wife	"Trembly feeling" in stomach continuously for four weeks. This sensation makes her exceedingly nervous. (Has had that feeling since her husband died four years ago, but lately it is getting worse.)
21	40	Wife	Subjective tremors in chest about once a month. Scares her. She has to induce vomiting to be relieved.
22	29	Wife	Objective tremors of hands. Subjective tremors of chest. Annoying but not terrifying. Lasting one-half hour.
23	36	Officew'k'r.	Objective tremors of hands and subjective tremors in abdomen. "This sensation makes her want to run away from herself and makes her excessively nervous"; lasting from four to six hours. If she lies down, closes her eyes and takes a strong cup of tea, she can overcome it in two to three hours. If anyone excites her the subjective tremors would recur. Usually recurs most severely before menses. Lately more or less constant, accompanied by vertigo.
24	36	Wife	Subjective tremors in chest when frightened.
25	32	Wife	Subjective tremors in chest and abdomen, continuous.
26	45	Wife	Subjective tremors in hands and body for the last two years; almost daily, lasting about one half hour; then they stop and return again either the same or next day. Vertigo with tremors which necessitates lying down until she gets over it.
27	42	Wife	Subjective tremors in abdomen, chest, arms and legs, all at the same time and lasting an hour, usually starting early in the morning. Does not have to lie down but "works it off."
28	33	Wife	Subjective tremors in abdomen and in back muscles while in bed, lasting a few hours. Once or twice a week during the last year.
29	21	Wife	Objective tremors of the body. Short quivering sensations in stomach every half minute, attacks lasting two or three days.
30	35	Wife	Objective tremors of right hand; subjective tremors in stomach on excitement. "Chattering of teeth."
31	24	Wife	Subjective tremors in abdomen.
32	18	Clerk	Subjective tremors in stomach, when excited or scared, lasting one-half to one hour; recurs occasionally as many as ten times a day. "It feels nasty."
33	38	Wife	Subjective tremors in chest (shortly after eating dry food).
34	38	Wife	Subjective tremors in stomach.
35	18	Clerk	Subjective tremors in stomach. Occasionally lasting two or three days, "passing off without doing anything."
36	49	Wife	Internal tremors in chest, legs and body at night. "Not visible"
37	23	Wife	Subjective tremors of stomach when excited, lasting a minute or two.
38	46	Saleslady	Subjective tremors in abdomen.
39	31	Wife	Objective tremors of hands. Subjective tremors in left inguinal region about three times a week lasting a minute or two.
40	46	Wife	"Trembly feeling in whole body, not in any particular part. Feels as if she were frightened. Body does not shake but it feels like it." Recurs on and off lasting about one-half hour. "Relieved on sitting down and quieting herself." Attacks during last three or four years.

Table IV. Women Who Reported.

No.	Age	Occupation	Results of Refraction	
1	44	Wife	Recovered	During migraine attacks suffers from objective voluntary tremors of arms and legs. "Inside trembling" in whole body accompanied by palpitation, lasting one-half hour, about once a week. Has to lie down during attacks.
2	60	Wife	Recovered	"Shaking inside" generally in the morning, only once in a while.
3	34	Office clerk	Recovered	"Trembling inside" every few days, lasting a few hours.
4	40	Wife	Recovered	Objective tremors of hands and body. "Inside trembling" in chest.
5	20	Wife	Recovered	Objective tremors of hands, legs and body. Subjective tremors in abdomen.
6	28	Wife	Recovered	Objective tremors of hands. Subjective tremors in chest.
7	37	Wife	Recovered	Objective tremors of hands and body. Subjective tremors in abdomen.
8	44	Wife	Recovered	Subjective tremors in region of stomach.
9	25	Wife	Recovered	Objective tremors of hands and body. Subjective tremors in chest, with sinking spells, especially when using eyes for near work, recurring two or three times a day, lasting one-half hour. Terrifying.
10	28	Wife	Not recovered	Subjective tremors in abdomen (not cured in seven weeks).
11	32	Wife	Recovered	Objective tremors of hands. Subjective tremors in chest.
12	42	Wife	Recovered	Subjective tremors in legs. Described as a "whirling feeling," something as if the head were confused; feeling was constant all day long. Felt better if she laid down, but could keep going. Legs felt at times as if they would give way under her. Sensation only annoying.
13	37	Wife	Recovered	Subjective tremors in abdomen, chest and knees; any little over-doing would bring it on; lasted about ten minutes and "made her weak," recurring two or three times a day. "A peculiar sensation that gives a wobbly feeling as if everything inside one was detached, an uncanny feeling."
14	58	Wife	Recovered	Subjective tremors in chest when she was "awfully nervous" a few times a day, lasting a few seconds only. Only annoying.
15	33	Wife	Recovered	Subjective tremors in stomach and arms. The sensation "makes her weak"; lasts one hour until she falls asleep; nearly every day.
16	31	Wife	Recovered	Subjective tremors in chest and abdomen. "It does not feel cold inside." Tremors last about five minutes; happens every day.
17	45	Wife	Recovered	Subjective tremors in stomach, nearly continuous, with frequent interruptions. Attacks last about one hour. While the sensation did not scare her it was so annoying that it nearly drove her frantic. Sensation felt during daytime and sleepless nights.
18	38	Wife	Improved	Subjective tremors in chest when tired and nervous, lasting 15 or 20 minutes, especially after supper. Three or four times a week. At times scares her and "feels as if her heart dropped down into her abdomen." Reports now about once a week "heart does not feel to drop in the abdomen any more."
19	32	Wife	Improved	Subjective tremors in chest and abdomen.

No.	Age	Occupation	Results of Refraction	
20	38	Wife	Recovered	Subjective tremors in stomach.
21	26	Wife	Recovered	Subjective tremors in heart and lungs on excitement.
22	41	Wife	Recovered	Subjective tremors in chest and abdomen when excited, lasting about ten or fifteen minutes.
23	32	Wife	Recovered	Objective tremors of hands and body. Subjective tremors in stomach when moving and working.
24	27	Wife	Improved	Feels "repeated motions in abdomen and chest." Also objective tremors of hands and legs.
25	26	Wife	Recovered	Subjective tremors in left side of abdomen and left inguinal region, a quivering lasting a few minutes, "most frequent at bedtime but not during the night."
26	39	Wife	Recovered	Subjective tremors in whole body, but "rarely and not visible," always about two weeks after menstruation.
27	25	Musician	Improved	Objective tremors of the fingers. Subjective tremors in the abdomen.
28	32	Wife	Recovered	Objective tremors of hands when tired. "Quiverings" in stomach recurring a few times a week, lasting one hour; relieved by resting.
29	29	Wife	Recovered	Subjective tremors in abdomen.
30	26	Stenog.	Recovered	Subjective tremors in abdomen.
31	42	Wife	Improved	Objective tremors of hands and body. Subjective tremors in stomach when excited, lasting from a few to twenty minutes. Reported greatly improved.
32	31	Wife	Recovered	Subjective tremors in arms and whole body, especially in chest and abdomen; "feels as if machinery moved and wiggled the parts." She cannot see the tremors nor feel them by touch. Often she would press her arms tightly during the subjective tremors without influencing the sensation in the least. These sensations occur when excited, as a rule daily, and last about one-half to one hour. During the attack she feels as if she had to move her bowels, but only rarely can she really defecate. During the attacks she is very restless, but does not lie down. Suffered from subjective tremors last four years. Reported within two months after refraction a perfect recovery.
33	24	Wife	Recovered	Objective tremors of hands and subjective tremors in the "heart," when excited, not of the pectoral muscles but below the ribs. She is sure there is no palpitation or actual tremor. Attacks last for days with frequent intermissions. In the beginning she thought she would die of it, now only annoying. Recovered within one week after atropinization of her eyes.
34	49	Wife	Recovered	"Shakes inwardly" in stomach, lasting occasionally all day. Does not scare her, just annoying. She had these tremors for the last three years.
35	39	Wife	Improved	Subjective tremors in stomach every few minutes.
36	24	Wife	Recovered	Subjective tremors in chest when excited lasting a few minutes.
37	37	Wife	Recovered	Subjective tremors in chest.
38	35	Wife	Recovered	Wakens frequently with subjective tremors of the whole body, especially the abdomen. Jerking (spasm) of abdominal muscles during the subjective tremor in stomach.
39	27	Wife	Recovered	Subjective tremors in chest. "Chattering of teeth." Scared. "Thought that she would never see her mother again." Attacks lasting about one-half hour. Recovered entirely.
40	20	Wife	Recovered	Subjective tremors in abdomen.
41	24	Wife	Recovered	Subjective tremors in chest. "Quaky feeling."

CONCLUSIONS.—It seems incredible that such a frequent eyestrain symptom as simple functional tremors has not as yet found its way in the medical literature, more so as it is so easily proved to be due to uncorrected anomalies of the refractive system.

It is also the first time the description of subjective tremors is given to the medical profession. The pathologic explanation is to be looked for in the over-stimulation of nerve centers of the eye, especially of the sympathetic system.

Finally I wish to explain the rather large number of cases I reported. My method of taking the anamnesis explains it. I ask all patients presenting themselves to me for refraction about the presence or absence of any eyestrain symptom known to me and I record the answers in an easily reviewable manner. Every patient is asked to return to report the results of the refraction. About half

of the patients comply with the request. The results are also entered in the same records. In this way I am not only told about symptoms which the patients never would have mentioned of their own accord because they considered them unimportant and irrelevant, but I am enabled mathematically to compile the results of hundreds of cases where otherwise I would have had only vague impressions.

Rare symptoms usually remain rare, because we take it for granted that they are such. Systematic and painstaking anamnesis will soon reveal to the astonished practitioner that they are more common than he may have imagined them to be. Besides unexpectedly satisfactory results in diagnosis or treatment are a more than ample reward for the trouble he may have taken in eliciting and recording detailed histories of his patient's symptoms, and of a conscientious recording of the results of his endeavors.

NOTES, CASES AND INSTRUMENTS

BLOCKING OF THE FACIAL NERVE IN CATARACT OPERATIONS.

MAJOR ROBERT E. WRIGHT, M.B.,
MADRAS, S. INDIA.

In cataract operations the orbicularis palpebrarum has always to be reckoned with. The patient who cannot, or will not, control this muscle is always a source of anxiety to the eye surgeon. In the Clinic of the Government Ophthalmic Hospital, at Madras, the term "squeezer" is used to indicate a patient who continuously or intermittently and without warning, "screws up" the eyes with force. Such patients usually give other evidences of trouble to come.

It is almost unnecessary to inquire of one's assistants if the subject is a "squeezer," for on approaching the operating table the surgeon may deduce from signs visual and auditory that the patient is likely to give trouble. Almost invariably a "squeezer" either mutters prayers under the breath, grinds the teeth, or keeps the great toes crossed. Such is the state of apprehension in some such cases that on the slightest touch the eye closes up like an oyster. These "prayer mutterers," "tooth-grinders" and "toe-crossers," are probably common to all Ophthalmic Clinics in India, and constitute a source of annoyance as well as anxious care to operator and assistant unless a general anesthetic be administered. The latter practice has never been adopted in Madras chiefly because of the amount of time which it takes up. As it was felt that the "squeezer" got more than his share of valuable time, even without a general anesthetic.

It was decided in the month of June, 1920, to try the effect of partially blocking the facial nerve before such patients were brought into the theatre, thereby putting the orbicularis temporarily out of action. It was determined to do this with the local anesthetic in ordinary use, namely 2% novocain. The injection was given five minutes before the patient came on the

table. The needle was entered over the center of the zygoma and following the line of the latter was pushed to the pinna. As it was withdrawn the infiltration was effected. The needle was then turned and pushed in the opposite direction but in the same line, to a point approximately below the center of the eye. The injection was given on withdrawal as before.

This gave an absolutely flaccid circumorbital musculature in the trial cases, and so this method was followed thruout. Up to date one hundred "squeezers" have been dealt with in this way. In one case flaccidity was not obtained, and the patient was able to excercise considerable pressure, it is difficult to understand why. In several cases muscular action was apparently exercised by the nasal muscles and the corrugator on the side of the injection in association with contraction of the orbicularis of the opposite side. There is no reason why a more complete paralysis should not be obtained in such cases by extending the anterior injection to the side of the nose and giving another over the glabella.

The actual position of the infiltration described above was adopted before looking up the literature on this subject. Subsequently the method of Van Lint as described in the Ophthalmoscope for 1914 was noted. The latter seemed practically the same as the procedure which we had adopted, and did not appear to have any special advantages over it, so no change was made in technic. Recently Villard has described a method of obtaining temporary paralysis of the lids, and abstracts of his article have appeared in Ophthalmic Literature for June, 1920, and British Journal of Ophthalmology for November, 1920. Here also the idea is the same, but the detail slightly different.

The actual method does not appear to matter very much, provided that one keeps the infiltration away from the lids. Novocain would appear to be preferable to cocaine. I do not wish to draw attention to a difference in meth-

od to those advocated by the above authors, but rather to support their principle.

The following conclusions have been arrived at: The method saves time, puts the operator and his assistants more at ease and facilitates the operation. It does not complicate the after treatment in any way as the lids are not interfered with. It does not appear to affect the patient adversely. After a fair trial the procedure has been adopted as a routine. Dr. K. Koman Nayar, who assisted at all the operations, is satisfied that the method is of value. I have to thank Mr. K. Pillay for carrying out the injections and collecting the cases.

THE RELEASE OF IRITIC ADHESSIONS TO THE ANTERIOR CAPSULE OF THE LENS BY SUCCTION PUMP MASSAGE.

HARRY VANDERBILT WÜRDEMANN,

SEATTLE, WN.

Read before the Puget Sound Academy of Ophthalmology and Oto-Laryngology, Seattle, Wash., February 28, 1921.

For possibly two decades I have occasionally resorted to a procedure for the relief of posterior synechiae, which has not, to my knowledge, as yet been recorded, tho its rationale must be evident to the thinking practitioner of ophthalmology.

Owing to the better education of the general practitioner in diagnosis, as well as the discriminating discernment of the public in applying earlier to the specialist, direct, for the treatment of eye afflictions, fewer cases, in proportion to those of previous decades are

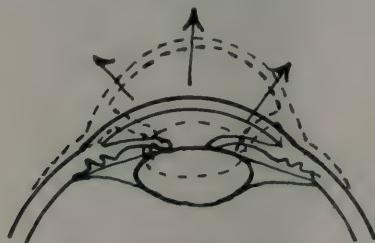


Fig. 1.—Effect of suction on anterior segment of eyeball shown in broken lines. Solid lines indicate normal position of part. Arrows show direction of force tending to burst adhesions.

found. Of improperly treated iritis, in recent years, in comparatively few well treated cases do adhesions of the iris result, for the rule of keeping the pupil open first, last and all the time during the course of this disease, or rather syndrome of disease, is well known and atropinization is rigidly followed out; whereupon the patient recovers with a full functioning iris and a pupil freely responsive to light and accommodation.

But we all see cases where application for treatment has not been soon enough, where atropin has not been used sufficiently and where adhesions have occurred which do not break way to intensive cycloplegia. In these it is well to endeavor to secure a round pupil, if only as an evidence of thorough and proper treatment. It is well known that eyes with a few iritic adhesions may not ever have another inflammatory attack, and that these synechiae do not particularly predispose to a recurrence or to secondary glaucoma, providing that there be sufficient drainage from the posterior to the anterior chambers. Therefore, operations for the relief of such adhesions, as were sometimes practiced in the past, are not alone unnecessary, but it was found that patients were subjected to a great risk of producing secondary cataract, and even when successful they accomplished no appreciable good.

I have found, in many cases—the number of which is immaterial and the

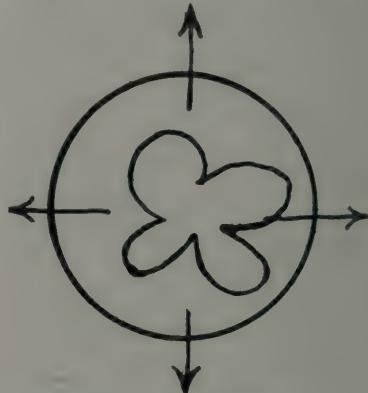


Fig. 2.—Diagram of iris and pupil bound down by posterior synechiae. Arrows indicate directions of force tending to set loose the adhesions.

report of which in detail would be inconsequential—that forcible massage of the eye by the suction pump breaks up these adhesions, and results in a free pupil. On a number of occasions I have reported the results of forcible massage in the treatment of embolism of the retinal vessels, in which the blood clot impacted in the artery was temporarily or permanently dislodged, with resultant return of vision.* This idea led me to try to break iritic adhesions by the same procedure and, in proper cases, it is eminently successful.

We use the Pynchon pump on the Victor electric apparatus, with the regulation cups.

I had a large size modification made of this, by which greater force may be obtained, which I believe is commonly sold with the machine. Suction and release with as long a movement of the piston as possible, in order to pull the eye in and out of its socket as far as can be, gives the best results.

The suction and release occurs at the rate of about 150 times a minute, is used for about one-half minute, the eye looked at and if no evidence of hemorrhages in the anterior chamber be found, used again for about a minute, the eye examined again and repeated for about one minute. On the next day the treatment may be given again if necessary, but in many cases the adhesions come away, leaving some of the pigment layer of the iris on the anterior capsule. The pupil becomes round and in an hour or so is found to be fully dilated under the influence of atropine.

There have never been any evil results, even when hyphemia has occurred. I would, however, hesitate to use it when there is evidence of implication of the ciliary body and the choroid, i. e., when there is minus tension, for the fear of producing a detachment of the retina or choroid, or intraocular hemorrhage. However, I have never had these accidents happen, even under the most strenuous treat-

ment, such as has been given in digital and suction pump massage, as used for embolism of the central artery or in numerous cases of glaucoma and in optic nerve atrophy.

The eyeball is quite resilient and, under the effects of external pressure, may be dented in or forced back into its socket and by suction pulled forward, the cornea drawn out and the shape of the globe temporarily changed. The cornea, being more elastic than the sclera, is more changed and pulled away from its base, thereby drawing the ciliary body and iris away from the lens, the lines of force being not only directly forward, but to one side as well. Hence, if the iris be attached at any part to the lens, the force tends to tear it away and thus relieve the adhesion.

THE PROPER TREATMENT FOR ACUTE SUPPURATIVE DACYCYSTITIS.

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ST. LOUIS.

From time immemorial the authors of ophthalmic text-books have told their readers how to treat acute suppurative dacryocystitis; and have divided the subject (treatment) into two parts: 1, If seen early, use abortive measures; and 2, if seen later, promote suppuration.

Let us discuss these phases of the subject. A. Abortive measures are supposed to include expression of the contents of the diseased lacrimal sac, the syringing of the lacrimal drainage apparatus with any one of numerous solutions varying from sterile water to strong antiseptics, the application of iced compresses to the region of the sac, appropriate intranasal treatment, rest, and the employment of agents to promote elimination via the intestinal tract. This sounds good theoretically; but never has a patient with this disease come under my care at a period sufficiently early to give the above measures any curative (or abortive) value.

B. If the patient is seen too late for the surgeon to employ the above men-

*(Annals of Ophthalmology, October, 1901; American Journal of Ophthalmology, January, 1906; American Journal of Ophthalmology, July, 1920.)

tioned measures, then we are to use hot fomentations, with anodynes, etc., until such time as fluctuation is present. The abscess is then to be opened and, later, probes are to be employed. (So say many of the books.)

The writer contends that such advice is wrong; that the accepted method of treatment is illogical, and that it leads to needless suffering and to unnecessary tissue necrosis. The writer has adopted the method of treatment which was used in the following case.

Mrs., aged 40 years, a strong, healthy woman, who had suffered from "cattarrh" and had shown right-sided epiphora for two years, came under the writer's care on the forenoon of February 7, 1921. For 48 hours she had shown the usual signs of an acute inflammation of the right lacrimal sac. She had passed a sleepless night. A small, hard brawny swelling was present at the region of the inner canthus.

At 5 P. M. of the same day, *under general anesthesia*, the following was done: The upper canaliculus was cut, the knife being carried into and beyond the sac. A Weber dilator was then passed thru the strictured lacrimo-nasal duct. The withdrawal of the instrument was followed by the escape of a few drops of thick creamy pus. A No. 9 Theobald probe was then passed thru the duct, and its presence in the nose was verified by touching it with another probe passed intranasally. Relief of pain was almost immediate. She left the hospital on the second day. On the third day, and also on the fifth day, a modified Bowman probe (No. 8) was passed. Since the sixth day there has been no discharge from the diseased area.

Modern surgeons believe in evacuating abscesses at the earliest possible period, and often exploratory incisions are made when the presence of pus is suspected. Such incisions, even if pus be not found, are beneficial. They relieve pain and lessen the tension of inflamed tissues. Why should dacryocystitis be an exception to the rule? The plan of treatment stated above has been followed by the writer for several years, with satisfactory results.

A NEW OPERATION FOR THE TREATMENT OF LACRIMAL OBSTRUCTION.

J. A. MACMILLAN, M.D.

MONTREAL.

The procedure which I wish to describe is the outcome of my operative experience with lacrimal cases at The Royal Victoria Hospital, Montreal, where, thru the suggestion of Dr. Byers, and thru his kindness and that of Drs. Stirling, Tooke, McAuley, and Rosenbaum, the entire material of this sort has been placed at my disposal during the past year.

The original intention was, that in this way a creditable presentation of the West method might be made before the meeting of the American College of Surgeons in October, 1920. It soon became apparent, however, that the results following the West operation were not uniformly good. After varying intervals a large percentage of the cases revisited the clinic with a return of symptoms. But during the course of this work, it occurred to me that, if one could transplant the transversely incised sac with its natural lumen into the nose, there would be less likelihood of closure than where a portion was excised from the lateral wall; and gradually the following procedure was evolved:

The usual skin incision is made, as for excision of the lacrimal sac, extending from just above the tendo oculi down and out, following the orbital margin. The skin is dissected up on the orbital side exposing the orbicularis muscle; the muscle is spanned up to the tendo oculi; and, on retracting both sides, the sac, covered by fascia, which passes from the posterior to the anterior lacrimal crest, is brought clearly into view. An incision is made thru the periosteum just in front of the anterior border of the sac; and with a blunt dissector the latter is raised from its fossa. The posterior border is also made free, and a tenotomy hook can be passed beneath the sac, up and down from the tendo oculi, to the beginning of the lacrimal canal.

The fascia covering the outer wall

of the lacrimal sac is continuous inferiorly with the periosteum on the floor of the orbit; and it is incised just where it passes off to become such. The sac is also cut transversely as far down in the canal as possible. A long silk suture is inserted thru the fascia near the lower end, leaving each end of the thread long, and with no knot.

A small lacrimal probe is now passed thru the canaliculus into the sac to make certain that it has been divided above the obstruction. The sac is now pulled upward toward the brow by the suture and a retractor, exposing the whole lacrimal fossa below the *tendo oculi*, which is always left intact.

The periosteum of the posterior half of the fossa is pushed backwards and forwards, exposing the lacrimal bone, which is extremely thin. An opening is made thru the bone into the nose with a sharp probe, and enlarged with a blunter one. I use a punctum dilator for this,—the sharp end to go thru, and the big end to enlarge the perforation to about the size of a pea. A small wick of gauze may be placed thru the opening and caught by a pair of forceps in the nose. Then by gently drawing backwards and forwards the margins can be made smooth. The orifice thus made is beneath the middle turbinate on the nasal side, and in front of the infundibulum.

Forceps are passed into the nostril, to grab both ends of the suture placed in the opening. The sac is then drawn down into the nose. The fascia is very strong, and holds the suture well. As it is also very closely attached to the sac, the latter must follow on traction. The suture is tied over a plug of gauze placed in the nostril for the purpose; the lacrimal canal is curetted as after excision of the sac; and the skin is sutured. A pad is placed over the wound; and a bandage applied.

The nasal plug is taken out on the second day; but the suture in the fascia is left until the fifth day, when it is removed with the skin suture, by drawing on either end.

It is too early as yet to make any

positive claim in regard to this operation; but the results to date have been so uniformly successful as to seem to justify bringing the matter to the attention of the profession in a preliminary note.

Ether has so far been used on all cases, but I hope to attempt block anesthesia on the next patient. I must close this note with a word of thanks and appreciation to Dr. S. E. Whitnall, Professor of Anatomy, McGill University, for free access to his anatomic material, and for helpful suggestions.

Postscript.

Since writing the above I have performed the operation under local anesthesia with satisfying results as follows:

Two pledgets of cotton, dipped in 10% cocain to which adrenalin has been added, are pressed dry. One is placed in the roof of the nose over the cribriform plate, and the other under the anterior end of the middle turbinate.

The infraorbital nerve is blocked after the method described by Smith ("Block Anesthesia and Allied Subjects"), that is, by injecting 20 minims of a 2% solution of procain (made fresh by dissolving the procain with suprarenin tablets in boiled distilled water) at the orifice of the infraorbital canal, the needle being passed in the bicuspid fossa and parallel to the long axis of the second bicuspid tooth.

To insure compete loss of sensation at the upper end of the incision, 10 minims are injected subcutaneously at and above the *tendo oculi*.

I have also applied this method with entire success in ordinary excision of the lacrimal sac previous to cataract operation.

My attention has been called to a paper by Dr. F. E. Burch, in the Transactions of the American Academy of Ophthalmology and Oto-Laryngology for 1920, describing an operation along somewhat similar lines. The central idea, being the passing of the lacrimal duct into the nose, is the same; but the procedures differ in many other details.

SUBCONJUNCTIVAL INJECTIONS OF DRUGS FOR INTENSIVE ACTION UPON THE IRIS.

WILLIAM BROWN DOHERTY,
NEW YORK.

Recognizing the fact that we are able to obtain better anesthesia by subconjunctival injection of cocaine than by instillation, it occurred to me that agents could be used in a similar manner in ocular affections in which we desire intensive action upon the iris or deeper parts of the eye. Accordingly I have injected atropin subconjunctivally with excellent results, as illustrated in the following brief histories.

CASE 1. Male, age 56, with history of recurring attacks of iritis. R. E. showed a number of pigment spots on the anterior capsule of the lens and posterior synechiae; the eye was quiet. V. equals 20/15 with correction and T.n.

L. E. had been painful during the previous four days, and he used the atropin left over from the treatment of a former attack, but without relief. When he entered the hospital, examination showed: cornea hazy; marked circumcorneal injection; aqueous cloudy; iris congested, dull in color, covered with exudate and bound down to the anterior capsule of the lens along the whole pupillary margin (iris bombé); tension 47; V. 3/200, with no improvement.

A small amount of powdered atropin was placed in the lower cul-de-sac, and hot compresses were employed. The second estimation of tension one hour later was the same as the first, and there was no dilatation of the pupil.

1/150 of a grain of atropin sulphat was injected subconjunctivally in the lower cul-de-sac, and hot compresses continued. In half an hour there was slight dilatation of the pupil; at the end of an hour, the pupil was irregularly dilated, and the tension dropped to 32. 1% solution of atropin sulphat was instilled into the eye twice during the night; the following day tension was normal, the pupil widely but irregularly dilated, the adhesions evidently being old, and the sequellæ

previous attacks of iritis. V. equals 20/30 with correction. The man disappeared and was not seen again.

CASE 2.—Service of Dr. Charles H. May, Bellevue Hospital: This patient was a man of 62, who had been complaining of pain, lacrimation, photophobia, and reduction of vision in L. E. He had been treated at the New York Eye and Ear Infirmary, where drops and an eye wash had been prescribed, but had not returned to that institution.

Examination of L. E. upon admission showed marked circumcorneal injection, cornea hazy, aqueous cloudy, iris dull, discolored, covered with an exudate, and the entire pupillary margin bound down to the anterior capsule of the lens (iris bombé), tension 54.

At 6 P. M. 1/150 of a grain of atropin sulphat was injected subconjunctivally and hot compresses employed; at 8:30 P. M. there was considerable dilatation of the pupil and tension had been reduced to 38; atropin sulphat 1% was instilled every 15 minutes for three doses. The next day the pupil was widely dilated, tension 23, and the eye was free from pain with V. 20/30. There were marked pigment deposits on the anterior capsule of the lens in the shape of a complete circle. The fundus was easily seen and was normal.

These two illustrative cases demonstrate the rapid and brilliant action of atropin, used subconjunctivally, in dilating the pupil and reducing tension in iris bombé, with increase of tension. I have found similar advantages when pilocarpin was injected subconjunctivally in a limited number of examples of chronic glaucoma with marked increase of tension. In these cases the pilocarpin was found to act much more quickly and decidedly than when employed in the usual manner by instillations.

I am at present employed in following up the results obtained from this method of using atropin, pilocarpin, and eserin, and hope before long to be able to report a much greater number of instances in which these agents were used subconjunctivally, and to give the results obtained.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.

November 18, 1920.

DR. G. ORAM RING, Chairman.

Anatomic Relations of Optic Nerve and Chiasm to Paranasal Sinuses.

J. PARSONS SCHAEFFER, Professor of Anatomy, Jefferson Medical College, Philadelphia, said that the retina from the viewpoint of embryology is a part of the brain, and the socalled optic nerve is a brain fiber tract supported by neuroglia elements and incomplete fibrous septa, and surrounded by tubular prolongations of the cerebral meninges and the meningeal interspaces. There is nothing in the visual apparatus which strictly corresponds to a peripheral nerve.

The axones composing the "optic nerve," commissure and tract arise from the ganglionic cells located in the retina and with the latter constitute neurons of the third order in the visual pathway. The fibers or axones converge toward the optic disc, pierce the vascular and fibrous tunics of the eyeball; then course centrally as the "optic nerve," the optic commissure and the optic tract, to terminate in the thalamus, the metathalamus and the midbrain. Identically the same axones or fibers form without interruption, and in order, the "optic nerve," the optic commissure, and the optic tract. It would, therefore, be more appropriate to designate the entire pathway the "optic tract." The fibers of the tract are medullated, but lack a neurolemma, being in general agreement with brain and spinal cord fiber tracts, in which the neurolemma is absent or greatly reduced.

In animals, man included, with an overlapping of the fields of vision of the two eyes and stereoscopic vision, the decussation of the optic pathways in the commissure is incomplete, while in vertebrates below mammals, the decussation is complete or nearly so. The

more laterally placed the eyes the more nearly complete is the decussation.

Therefore, in dealing with the anatomic relations which exist between the optic nerve and the optic commissure and the paranasal sinuses, one is concerned with a partially decussated brain fiber tract with cell bodies located forward in the retina, rather than with a peripheral nerve. The efferent neurons of the optic nerve with cell bodies located centrally need not concern us in this connection.

The socalled optic nerve leaves the eyeball approximately 3 mm. to the mesial side of the posterior pole and follows a slightly serpentine course dorsalward, medialward, and cranialward toward the optic foramen or canal in the apex of the orbit. After traversing the optic foramen medial and cephalic to the ophthalmic artery, the optic nerve courses intracranially, converges toward the midline, and after a variable distance meets with its fellow in the formation of the optic commissure or chiasma. It is, therefore, obvious that the two optic nerves are far apart ventrally where they leave the eyeballs and gradually converge more and more, ultimately to merge in the vicinity of the tuberculum sellæ (olivary eminence), between the internal carotid arteries. It is equally clear that for some distance behind the eyeballs the optic nerves are separated from the thin osseous walls of the paranasal sinuses by the interposition of a goodly amount of orbital fat. Moreover, as the optic foramen and the optic commissure are neared, the topographic relationships between the optic nerve and commissure and the paranasal sinus become more and more intimate, ultimately resulting in very many cases in the optic nerve and commissure, coming into actual contact with the thin osseous walls or the mucous membrane (when osseous dehiscences are present) of certain of the paranasal sinuses, especially the posterior ethmoidal and the sphenoidal.

The optic nerve topographically may

be divided into *ocular*, *orbital*, *foramen* and *cranial segments*. The whole nerve varies in length, the greatest variation occurring in the length of the cranial segment, the optic commissure being formed at a variable distance dorsal to the optic foramen. The following table is illustrative of this variation (Table A):

Cadaver.	Total length.
M.....	49 mm.
N.....	38 mm.
O.....	43 mm.
P.....	33 mm.

For our purposes here it is well to divide the optic nerve into *sinus* and *nonsinus portions* and to compare these segments with the entire length of the nerve, using *sinus portion* to mean that segment of the nerve which is 2 mm. or less from the walls of the paranasal sinuses. The following table indicates this comparison and relationship (Table B):

TABLE A.

Orbital.	Foramen.	Cranial.
27 mm.	6 mm.	16 mm.
28 mm.	6 mm.	3 mm.
30 mm.	5 mm.	8 mm.
25 mm.	4 mm.	4 mm.

lated sinuses comes into actual contact with the dural investment of the optic nerve and the optic commissure. Indeed, the lateral wall of the sphenoidal sinus may be so defective that the mucous membrane lining the sinus protrudes as a hernia or a diverticulum. The thickness of the plate of bone between the optic foramen and the contained optic nerve and the cavity of the

TABLE B.—LENGTH OF OPTIC NERVE (IN MILLIMETERS).

Cadaver.	Total length.		Nonsinus portion.		Sinus portion.	
	Right.	Left.	Right.	Left.	Right.	Left.
A	45	45	24	21	21	24
B	37	35	14	13	23	22
C	44	44	21	22	23	22
D	40	40	19	23	21	17
E	55	48	28	27	27	21
F	43	41	15	15	28	26
G	48	46	24	20	24	26
H	39	42	15	14	24	28
I	38	40	16	20	22	20
J	40	40	30	10	20	20
K	37	36	14	14	23	22
L	54	48	28	27	26	21

The great variations in size, shape, number and type and the variations in symmetry and asymmetry of the paranasal sinuses preclude any constancy in the topographic relationships of the optic nerve and the commissure to the sinuses. Unfortunately it is not the province of this brief abstract to

sphenoidal sinus varies, according to the material studied, from a total absence to 2 mm.

One or more of the posterior group of ethmoidal cells are nearly always intimately topographically related to the optic nerve. When a posterior ethmoidal cell extends into the body

of the sphenoid bone at the expense of the lumen of the sphenoidal sinus the ethmoidal cell in question replaces the sphenoidal sinus in the optic nerve relationship. In general the most dorsal of the posterior ethmoidal cells concerns us most in this connection. However, at times, other posterior ethmoidal cells not in actual contact with the sphenoidal sinus establish very intimate topographic relationships with the optic nerve as well.

The optic nerve crosses the upper and lateral angle of the sphenoidal sinus. In very many cases the thin wall of the sinus is pushed into a mound-like relief by the nerve, so that in a sense the nerve passes thru the sphenoidal sinus, separated from the contained lumen merely by thin bone, and when osseous deficiencies exist, only by the mucous membrane. The asymmetry of the sphenoidal sinuses may be so great that either the right or the left sinus establishes intimate and vital relationships not only with the optic nerve of the same side but also with the optic nerve of the opposite side. For example, one encounters specimens in which the right sphenoidal sinus comes in actual contact with the right optic nerve, the optic commissure and the left optic nerve, the left sphenoidal sinus being wholly crowded from the usual intimate topographic relationship. The opposite anatomy also prevails with equal force.

The optic commissure bears a variable relationship to the sphenoidal sinuses. The inconstancy of the relationship is due, first, to the great variations in size and shape and to the asymmetry of the sphenoidal sinuses, and, second, to the variations in the distance behind the optic foramen at which the optic commissure is formed (see Table A). In very large sphenoidal sinuses, especially in the ventrodorsal plane, the optic commissure is located in the roof of the sphenoidal sinus and some distance in advance of the dorsal wall. On the contrary, in small sphenoidal sinuses, the optic commissure lies dorsal to the sphenoidal sinuses. Moreover, the intracranial segment of the optic nerve is relatively

long and the optic commissure formed far dorsal, the commissure rests upon the hypophysis cerebri and the intimate topographic relationships between the optic commissure and the sphenoidal sinuses are thereby precluded. The location of the optic commissure immediately above the hypophysis is very common. It is when the intracranial segment of the optic nerve is short and the optic commissure formed over the tuberculum sellæ ventral to the location of the hypophysis cerebri that the very intimate topographic relationships between the optic commissure and the sphenoidal sinuses are made possible. Of course, in those cases in which the sphenoidal extend forward into the ethmoidal masses, thereby replacing certain posterior ethmoidal cells, the optic commissure is always in the roof of the sphenoidal sinuses. Owing to the almost constant asymmetry of the sphenoidal sinuses it is rather common to find one or the other of the sinuses wholly replacing its fellow in the topographic relationships with the optic commissure. In symmetric sinuses both sinuses may share the usual commissural relationships.

The ostium of the sphenoidal sinuses is disadvantageously located for good drainage, being placed a goodly distance from the sinus floor. Indeed, in some cases pus in the sinus would rise almost to the location of the optic foramen before it could escape thru the aperture of the sinus into the nasal cavity. The following tables illustrate this relationship (Tables C and D):

TABLE C.

Side.	Distance from center of ostium sphenoidale to root of sinus.	Distance from center of ostium sphenoidale to floor of sinus.
R.....	12	17
L.....	10	13
R.....	12	12
L.....	12	9
R.....	2	3
L.....	16	13
R.....	2	20
L.....	12	17
R.....	3	6
L.....	12	4
R.....	15	17
L.....	17	16

TABLE D.

Distance Between Cadaver.	Optic Nerve and Ostium Sphenoidale.	
	Right.	Left.
A.....	8	12
B.....	9	5
C.....	9	11
D.....	15	15
E.....	2	2
F.....	4	0
G.....	6	0
H.....	12	12
I.....	4	4
J.....	2 above	1 above
K.....	3 above	2
L.....	6	13

The frontal sinus when of the supraorbital type and well developed dorso-medially may establish intimate topographic relationships with the optic nerve in the neighborhood of the optic foramen. As a rule, however the frontal sinus is not vitally related.

In the vast majority of instances a goodly amount of orbital fat separates the maxillary sinus from the optic nerve. Rarely, however, when the maxillary sinus pneumatizes beyond the confines of the maxilla into the orbital plate of the palate bone and into the neighboring ethmoidal mass it comes in contact with the optic nerve, thin bone alone intervening.

The most dorsal of the anterior group of ethmoidal cells occasionally are a factor in optic neuritis. This is when the anterior group of cells encroach upon the more usual confines of the posterior group. It should always be recalled that it is not the location or topography of the ethmoidal cells that determines the groups, but the location of the ostia of the cells in the nasal cavity; the anterior group draining into the nasal cavity caudal to the attached border of the middle nasal concha and the posterior group cephalic.

DISCUSSION. Dr. James Bordley, Jr., of Baltimore said: The ocular symptoms in disease of the sinuses may be inflammatory neuritis, retrobulbar neuritis and choked disc, altho it must not be inferred that ophthalmoscopic changes are to be discovered in the fundi of every patient with sinuitis. On the contrary, in only a compara-

tively small proportion of cases do they occur.

Dr. Bordley emphasized the importance of the enlargement of the blind spot of Mariotte in sinus disease, altho he was forced to object to the suggestion that enlargement of the blind spot was a constant symptom. In 102 patients with sinuitis, enlargement of the blind spot was discovered but 31 times, and it was found 5 times as frequent in disease of the posterior as of the anterior sinuses. In his experience subnormal accommodation was a more frequent symptom of sinus disease.

Dr. Charles P. Grayson said: It may be true that the larger number of sinus inflammations, both symptomatically and clinically, are so aggressively obvious that the ophthalmologist will need no assistance whatever in recognizing their existence, and there are many others in which thru the history of a more or less severe infective rhinitis, followed by deep-seated intranasal pain or persistent headache at the vertex or perhaps occipital in its location, he will be easily able to make at least a presumptive diagnosis with a great deal of confidence; but there are still others, unfortunately not few in number, in which the rhinologist himself must be deliberate rather than hasty in reaching a diagnosis. In such cases, obscure perhaps because of their smouldering quiescence, there is one fact that will bear a little emphasis, and that is that a merely clinical examination if negative will have very little value. It is no more to be relied upon than is a single negative Wassermann. The failure to discover pus in the middle meatus, the sphenoethmoidal sulcus or on the posterolateral wall of the pharynx is far from being conclusive evidence as to the health of the sinuses.

Dr. Grayson assumed that in this clinical scrutiny we have relieved any obstruction to drainage from the normal ostia, that we have called upon the law of gravity and have availed ourselves of irrigation when possible and of the rather equivocal suction apparatus in the effort to extract pus from the sinuses, but nevertheless failure to secure it does not complete our examination. Naturally, we next appeal, and

with much confidence, to the X-ray plate, and yet not always with implicit confidence, for its findings, for several reasons, may be dubious and inconclusive even when its tonal values are interpreted by an expert. In such cases nothing remains for the conscientious, thorough clinician but to ask permission to make an exploratory opening into the suspected sinus. If this be granted and a sufficient opening made, doubt will vanish.

Dr. Wm. Campbell Posey spoke of some of the less striking but perhaps more common symptoms of sinuitis. He thought asthenopia was often provoked by a chronic inflammation of the conjunctiva, with enlargement of the lymph follicles, occasioned by the spread of the inflammation of the mucous membrane lining the sinuses to that lining the lids. He said that actual testing would often show a diminution in the range of accommodation.

Edema of the lids is one of the most significant symptoms of disease of the accessory sinuses and may often be the means of calling attention to the existence of an inflammation in these cavities, the extreme thinness of the skin of the lids and its loose attachment to the underlying parts, causing even a comparatively slight sinuitis to give rise to this condition. The puffiness is usually most marked in the upper lid and particularly on the nasal side, though the entire lid may be swollen. This edema is to be distinguished from the inflammatory swelling and thickness of the lid which results from cellulitis, as it is entirely noninflammatory in origin as well as in appearance, and also from the ptosis which is at times present as a result of a palsy of the levator of the lid. The swelling is usually most marked in the morning and disappears during the day, but it is also liable to be brought on by bending the head forward. Like all other symptoms of sinuitis the edema may disappear for a time with the discharge of secretion from the sinus, but reappears when the fluid reaccumulates and the congestion of the mucous membrane becomes greater.

Dr. Posey said that while fifteen years ago sinuitis was rarely held responsible for optic nerve disease, there was now a

tendency in some quarters to attribute all cases of optic nerve disease, for which no other cause could be found, to sinus trouble; and to operate upon those cavities even tho' the actual evidence that they were in a pathologic condition was not present. He referred to a recent communication by Cushing, who called attention to the harm done by such abuses.

In conclusion, Dr. Posey said that he was an advocate of *the orbital incision* in all cases of orbital disease from the sinuses, and he believed the association of the rhinologist and ophthalmologist in the performance of such operations most desirable. Closure of the orbital skin incision, after the diseased tissue has been removed from the affected sinus, and free drainage established into the nose by tubes of good size, which should be permitted to remain buried *in situ* until the drainage canals have become well established, should be practiced whenever possible.

Dr. George Fetterolf spoke of the difficulties attending the diagnosis of sinus conditions. He took up and discussed, as bearing on this question, anomalies, the usefulness and limitations of transillumination and X-rays, and the inadvisability of making a negative diagnosis on one examination. He stated that vacuum headaches and neuralgias of the sphenopalatine ganglion, as brought out by Sluder, should always enter into the calculation. He expressed the opinion that there should be greater cooperation between the ophthalmologist and the otolaryngologist, emphasizing the importance of having the former examine suspected sinus cases with the idea of noting conditions which were unknown to the patient and which would be of distinct sinus diagnostic value. Dr. Fetterolf further stated that neither he or anyone else was satisfied with the present status of sinus diagnosis and treatment, and hoped for better things thru improved X-ray technic, a constant thinking by the otolaryngologist in terms of anomalies, by greater intensive study of each case and by closer association of the eye and nose specialists.

Dr. Luther C. Peter recalled an excellent paper read before this section about two years ago by Dr. Ring, who said: "It is a fact that the careful spe-

cial testing of visual function, and the finding of certain changes in the visual field, may establish a diagnosis before nasal symptoms have been sufficiently marked to attract attention; and, further, it is not infrequent for closed empyemas and mucoceles to give a false sense of security by an almost total absence of nasal symptoms notwithstanding the presence of ocular change." To these well-established facts should be added a third, that visual field changes may be detected before patients complain of a disturbance of vision and before the ophthalmoscope reveals any fundus pathology. These facts form a tripod upon which the claims of ophthalmologists rest in insisting that all sinus cases should be studied from an ophthalmologic standpoint, and especially by means of perimetry.

Enlargement of the blind spot in disease of the posterior cells is generally accepted as an almost constant symptom. The exact means by which this is brought about is not nearly so important as the recognition of the fact that it does exist. It means a perineuritis in some part of the nerve, and the proximity of the optic foramen to these cells is most apparent. It probably is the result of continuity of tissues and of toxemia. It is present in acute and chronic disease. It is rarely present in disease of the anterior group. If present in the anterior group it is a late phenomenon, is associated with other field changes, with gross fundus pathology and usually is part of a central scotoma.

Chiasmal anopsias are equally localizing in value. They are more or less infrequent complications and usually signify advanced chronic disease of the posterior ethmoids and sphenoids. Almost any variety of chiasmal anopsias may occur.

Enlarged blind spots and irregular anopsias are definite and localizing. They belong to the posterior cells. Other field changes are not so differentiating in character, but are just as important and perhaps even more than those mentioned in estimating the amount of damage sustained by the optic nerve. In order to give them their proper interpretation, however, they must be studied in con-

nexion with other symptoms, with the appearance of the fundus and especially with those found in the nose. Their chief value lies in determining the degree of damage, and as such they should be a part of every routine examination for sinus disease.

Surgical interference may be indicated by the nasal findings, but surgery should not be practiced without proper ophthalmologic studies, and visual fields should always be carefully plotted. Statistical studies reported in the literature vary some as to the percentage of cases in which visual field changes are found. Wallis found 100 per cent of cases involved in disease of the posterior cells and 90 per cent of total cases. Other writers place the percentage, at least, of the anterior cells lower. Markbreiter found 76 per cent of the anterior cells had pathologic fields. The reasons for these discrepancies are threefold:

1. A limited number of cases, especially of the anterior group, are not accompanied by optic nerve involvement.
2. A large number of cases never reach the oculist for study.
3. Perimetric technic may be faulty. These studies must be painstaking. They cannot be made on a perimeter. They should be made on a tangent screen of a one meter radius.

Inasmuch as the optic nerve is involved in so many cases of disease of the paranasal cells, all cases of sinus disease should be studied from the standpoint of the ophthalmologist as well as from that of the rhinologist. Careful perimetric measurements are a most important part of such studies.

Dr. E. B. Gleason said the picture of the frontal sinus extending far back over the orbit reminded him of one he saw in the dead room that also extended upward nearly to the coronal suture. It occurred in an old man and probably there is a tendency for all the paranasal sinuses to enlarge in old age. The presence of processes from the mucoperosteum extending into the bone explains why in attempting to extract the mucous membrane from a posterior ethmoid cell or the sphenoid if the orbital wall is thin, bone will sometimes come away with the

mucous membrane as the result of traction.

According to Leon E. White, of Boston, accessory sinus blindness results from (1) direct spreading of the infection to the sheath of the optic nerve, (2) toxemia, (3) hyperplasia.

In chronic cases of infection of the posterior ethmoids and sphenoids there may not be any symptoms for years except postnasal secretion and occasional headaches. Phlebitis of the cavernous sinus, meningitis and brain abscess are rare. The same is true of loss of vision. Blindness may persist for a time, to be followed by spontaneous recovery, altho if it persists for several months it may be irremedial. As improved vision sometimes occurs after a discharge of pus it would seem to be often more intimately connected with retained secretions than the infection.

White in the paper referred to above gives a series of cases of blindness in which improvement followed removal of the middle turbinate and opening the sphenoid. The simplicity of his operative measures is noteworthy. In some of his cases there was no marked nasal lesion either by inspection or the X-ray —only hyperplasia, which is defined as a "rarefying osteitis associated with inflammatory swelling of the mucous membrane lining the accessory sinuses." Jonathan White, quoted in the same paper, states: "It would be difficult to find an adult individual in a temperate or cold climate who does not present an example of this bone change within his nasal chambers." White also quotes MacWhinnie as advocating, in 1910, opening the sphenoid in cases of optic neuritis as a practically harmless procedure. However, having met wth fatalities, MacWhinnie soon afterward practically abandoned all operative procedures in suppuration of the paranasal sinuses in favor of treatment by suction. So greatly has the popularity of nonoperative treatment of accessory sinus suppuration increased that a recent folder of a prominent New York instrument maker is devoted entirely to suction instruments. Besides suction other methods of treatment have been devised. One

recently proposed consists in filling both nasal chambers with normal salt solution and *floating* out the pus contained in the sinuses. It is said to have succeeded in cases in which operative measures failed.

Dr. Geo. E. Pfahler said it was his custom to make at least three postero-anterior views of the sinuses, and in this way one gets the outline of the sinuses in the transverse vertical planes and therefore shows the lateral and vertical limitations. He then makes two lateral views, either stereoscopically or one from each side, which gives a view of the vertical plane in the longitudinal direction and therefore gives the anterior and the posterior and the upper and the lower borders. He then makes a vertical exposure, which gives the horizontal plane and shows the anterior, the posterior and the lateral borders. By a careful study of these the exact size, outline and position of the accessory sinuses can be shown. Disease produces either an opacity of varying degrees or causes thickening or destruction of the walls of the sinus. One must always keep in mind the value of these transparencies and opacities of shadows in proportion to the size. A small sinus may give no more transparency, tho healthy, than a large sinus filled with exudate. Therefore the value of these shadows must be interpreted most carefully. We encounter many technical difficulties, but these are gradually being overcome. In 1912 he described an oblique view of the sphenoid sinuses by means of which technic the sphenoid sinus was projected into the orbital area and by comparison of the two sides additional information can be obtained. We cannot determine, in all instances, the relations of the optic nerve to the accessory sinuses, but in many instances the optic foramen or canal can be shown.

Dr. Pfahler was quite sure that by means of roentgenography the greatest information concerning these sinuses can be obtained, but skill is necessary both in the making of the films, and in their interpretation.

J. MILTON GRISCOM, M.D.,
Clerk.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

February 8, 1921.

DR. ELLETT in the chair.

Amblyopia Since Birth.

DR. FAGIN presented a boy of 8 years, blind in the right eye since birth. This boy is a twin, the second to be born. The parents felt that the attending physician had injured the eye doing a manual delivery. The mother noticed when the baby was two weeks old that the right pupil was larger than the left and that the iris and cornea seemed smaller and that there was a whitish line across the lower border of the right pupil. Dr. Fagin saw the patient first on September 6, 1918, at which time there was not even light perception in the right eye. Right pupil dilated and oblong. Vitreous filled with exudates. Iris atrophied. Ball turned in and up. No inflammation. Left eye normal in appearance; vision 20/30. A plus 0.50 S. was prescribed for school work. Dr. Fagin saw this patient again January 17, 1921, when there was quite a decided change for the worse. The right ball was red and hard to touch. The entire vitreous is opaque. The sclera was thinning and there was a dark choroidal ring above near the limbus. The iris more atrophied and tremulous above. Tension—McLean 50. Left eye in a state of irritation. Dr. Fagin advised enucleation and was interested to see if there was an intraocular growth or if the opacity was due to inflammation.

DISCUSSION. Dr. Savage said that if the boy were three or four years old he would think the case one of glioma of the retina. He was anxious to see the specimen after removal.

Dr. Stanford thought it a cataractous lens with extremely deep posterior chamber.

Dr. Fagin had seen the child two years ago, and was certain there was no cataract at that time; but he saw vitreous opacities and pupil changes. He is sure that the vitreous is involved.

Trauma of Head Followed by Blindness.

DR. FAGIN presented a colored man, 31 years old, who was struck on the head June 16, 1918, following which the patient has noticed that his vision has grown gradually worse. From August 29, 1918, the patient has been blind, not even light perception in either eye. Examination revealed normal appearance of eyeballs and lids. Each pupil slightly dilated and immovable. The brightest light had no effect on pupils. The fundus has normal appearance except for the fact that the nerve heads were rather white and bluish in tint; not a typical atrophy. The blood vessels are normal in appearance. The problem of this case is whether the injury to the back and side of the head, which shows scars, could have caused the blindness.

DISCUSSION. Dr. Lewis asked if the patient's mentality was affected to which Dr. Fagin answered in the negative.

Dr. Simpson said that the condition might be due to injury to the visual center, or posterior to the point of entrance of the vessels to the nerve.

Dr. Blue agreed with Dr. Simpson.

Dr. Anthony said that it might be due to brain tumor or toxemia.

Dr. Ellett said that the condition was hard to understand, as many cases in negroes do not look like primary atrophy, and believed it due to the injury.

Dr. Stanford asked Dr. Ellett just what would take place to produce such effect.

Dr. Ellett answered that a depressed fracture or hemorrhage would.

Secondary Cataract.

DR. ELLETT presented a man upon whom he had operated for cataract in each eye. Simple extraction with corneal suture on each eye. The right eye had a perfectly clear pupil without secondary cataract; vision 20/20 with glasses. In the left eye there was much reaction and a dense secondary cataract; vision with glasses 20/40.

Double Ptosis.

DR. ELLETT presented a girl of eleven years upon whom he had done a double Motaïs operation for ptosis, four years ago. The operation was performed un-

der general anesthesia. The result was very good altho not the same in the two eyes. A greater result was obtained in the right eye and the child tends to sleep with the eye open and there is occasional corneal irritation.

DISCUSSION. Dr. Levy thought the results wonderful.

Dr. Simpson asked if corneal ulceration ever followed this operation.

Dr. Ellett said that he had not seen such but said that in a paper on the Motaais operation by Bruns he mentioned a case followed by corneal ulceration.

Zonular Cataract.

DR. ELLETT presented a boy four years old with zonular cataract in each eye. Eyes otherwise normal. A free discussion had been made in the right eye five days ago. The lens was much swollen and the opaque nucleus was broken in several pieces and lying in the anterior chamber. There was scarcely any reaction.

Optic Nerve Atrophy.

DR. ELLETT presented an elderly negro with mental disturbance which precluded the possibility of obtaining a history. There was loss of vision in each eye. The pupils were fixed. The right eye showed a cupped and atrophic nerve. The left eye showed atrophy of the nerve with hemorrhages and connective tissue changes associated with the retinal vessels. There were bands of retinitis proliferans and other bands along the vessels as well as irregular retinal hemorrhages. Tension R. 40, L. 52, Gradle.

Exudative Choroiditis.

DR. ELLETT presented a young lady who had exudative choroiditis and fine vitreous opacities, of one week duration, the cause being as yet undetermined. Physical examination negative. There were fresh choroidal exudates up and in from the disc, and beyond them a pigmented area probably the scar of a previous attack. Vision was slightly reduced.

DISCUSSION. Dr. Blue said that this was apparently a second attack.

Dr. Simpson asked if the tonsils had been removed.

Dr. Ellett answered in the negative.

Dr. Simpson advised the removal of the tonsils.

Dr. Savage asked Dr. Ellett if he had ever seen choroiditis sequent upon a diseased tooth, which recovered after removal of the tooth.

Dr. Ellett answered that he had seen such cases, and stated that many cases of exudative choroiditis are of undetermined origin.

EDWIN D. WATKINS,
Secretary.

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY.

December 21, 1920.

DR. CLAUDE UREN, Chairman.

Primary Sarcoma of the Middle Ear Treated by Radium.

DR. WM. F. CALIFAS read this paper.
Electric Regulated Thermophore.

DR. JAS. M. PATTON showed this instrument devised by Shahan and Post of St. Louis. He stated that he has found best to use it at 150-152 degrees for one minute. He says that it remains constant within one degree. He reported several cases which responded favorably to treatment, especially cases of deep infiltration of the cornea in so-called corneal abscess.

Glioma of Retina.

DR. PATTON reported on two cases seen recently, both in infants. In one case the parents noticed nothing but a slight divergence in one eye; and when the patient was first looked at with a small pupil, nothing could be seen with the ophthalmoscope, owing to the patient's restlessness. When the pupil was dilated, however, a tumor could be seen temporal to the nerve. The eye was enucleated and the second eye examined under a mydriatic, no pathology being found in that eye. Frozen sections of the cut end of the nerve showed no extension of the tumor into the nerve. Radium, was used, however, in the socket.

The second case showed a much further developed tumor in the first eye, tho the second eye was free. After enucleation frozen sections of the nerve showed extension of the tumor beyond the cut end. Evisceration of the orbit

was considered but it was decided to use heavy doses of radium.

Fibroma of Optic Nerve:

DR. CLARENCE RUBENDALL reported a large fibroma of the optic nerve, which caused marked exophthalmos, and which was removed completely in its capsule.

Ulcer of Cornea.

DR. SANFORD GIFFORD presented a patient showing a central ulcer of the cornea, occurring with facial paralysis. Scrapings of the ulcer showed gram negative diplobacilli, which grew on blood serum but would not grow on agar and so could be classed as Morax-Axenfeld bacillus. It was treated with applications of 20% zinc sulphat. The anterior chamber was kept open for some time, but in spite of this it proved obstinate to treatment and finally improved rapidly after one application of the thermophore. At present it shows only a leucoma with a moderate amount of congestion.

DISCUSSION. Dr. Lemere stated that he had recently seen a case with a similar ulcer occurring in a man with facial paralysis, which is still under treatment.

S. R. GIFFORD,
Corresponding Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

February 19, 1921.

DR. D. G. MONAGHAN, presiding.
Penetrating Injury of Eyeball.

W. C. BANE, Denver, presented a man aged forty-seven years whose right eye had on February 14, 1921, been penetrated by the end of a nail which he was cutting off. The fragment was about 25 mm. long and 4 mm. in diameter. It entered thru the lower nasal quadrant of the cornea, stuck in the eye, and was pulled out by a layman. It was uncertain to what depth the nail had entered the eyeball. The cut in the cornea was angular and 6 mm. long. The iris was incarcerated in the wound. Blood filled the lower two-thirds of the anterior chamber two days after the accident. Vision was now light perception, the eye was painful, and the tension was about normal.

DISCUSSION. Edward Jackson, Denver. In the series of cases reported by Haab, the large majority of the foreign bodies were fragments from the hammer. In this case, however, we have the exceptional fact that it was the nail that entered the eye.

G. L. Strader, Cheyenne, Wyoming, described a recent case in which a piece of steel from a hammer had lodged in the vitreous, from which it had been pulled with the giant magnet thru the wound of entrance. The wound healed almost completely, but on account of later disturbance the eyeball was eviscerated. A piece of steel one and one-eighth inch long was then encountered, passing thru the coats of the eyeball. The case illustrated the need of making an X-ray study in every instance.

W. C. Finnoch, Denver. The type of eye under discussion is always interesting microscopically, and it is desirable that where the eye is removed it shall be preserved for study. This is especially true if the eyeball has remained in the orbit for several weeks and has then become inflamed again. It is possible to tell whether this is an irritating eye or not by the appearance under the microscope.

J. M. Shields, Denver. In an injury of this kind, is it possible to get a wound between the lens and ciliary body large enough to allow escape of vitreous without serious injury to the ciliary body?

F. R. Spencer, Boulder. I think we see such cases in which the ciliary body has not been seriously injured.

E. R. Neeper, Colorado Springs, referred to a case which had been in charge of another oculist, and in which posterior synechia had developed because the other oculist had used eserin instead of atropin. The reason for doing this was stated to have been a risk of loss of vitreous if atropin were employed. Dr. Neeper strongly questioned the use of a miotic in such cases and felt that here if ever the use of atropin was called for.

Burn from Welding Compound.

W. C. BANE, Denver, presented a man aged twenty-five years who on January 18, 1921, had received in the inner canthus of the left eye a hot welding compound consisting of borax and iron filings. The external tissues over the in-

ner half of the eyeball, including the caruncle and the lid margins, were white from burn. A few scales of metal were removed from the lower cul-de-sac. The patient now showed a marked contraction of scar tissue in the affected area of the bulbar and palpebral conjunctiva. The sight was, however, apparently not affected.

DISCUSSION. J. J. Pattee, Pueblo, remarked that the interesting point about this class of injuries was the difficulty of deciding beforehand how much disfigurement the injury was likely to produce. A burn of the nature of an electric flash may have an ultimate result out of all proportion to the original appearance of the case. Dr. Pattee had seen such a case in which the cornea became ultimately completely opaque, although immediately after the injury he had failed to appreciate the probability of this occurring.

Congenital Pigment Deposits in Retina.

J. M. SHIELDS, Denver, presented a man aged twenty-seven years who was under treatment for tuberculosis and had come complaining of asthenopic symptoms. The case was presented on account of an apparently congenital peculiarity in the right fundus, consisting of small rounded areas of pigmentation at some distance below the optic disc. The pigment was arranged somewhat like a bunch of grapes, seemed to be entirely in the retina, and was beneath the inferior temporal vein.

DISCUSSION. F. R. Spencer, Boulder. The pigment has such a distinct outline, and evidence of exudate or atrophy is so completely absent, that the condition is very probably congenital.

Choroiditis from Nasal Sinus Infection.

D. A. STRICKLER, Denver, presented a woman aged thirty-five years who had been brought before the society in December, 1920, on account of an obscure disturbance of vision without definite fundus changes; the underlying cause being possibly a multiple infection of the nasal accessory sinuses. The case had unfortunately fallen into the hands of a dentist who had disregarded the wishes of the physician and had limited treat-

ment to irrigation of the antrum thru an opening in the alveolar process. The vision was no better and there were now definite areas of choroidal disturbance. The antrum still gave a shadow on the X-ray plate.

DISCUSSION. J. A. Patterson, Colorado Springs. It is doubtful whether the choroidal disturbance is due to the antral trouble, but the infection in the antrum is probably connected with involvement of the other sinuses. The X-ray appearances outside of the antrum ought to be of special value in this case, particularly as regards the ethmoids and sphenoids.

F. R. Spencer, Boulder, agreed with Dr. Patterson in strongly disapproving of the tendency of some dentists to assume the responsibility of telling patients that such conditions would be adequately treated by draining the antrum into the mouth.

Tuberculous Iridocyclitis.

H. M. THOMPSON, Pueblo, presented a woman aged twenty-two years who in August, 1918, had suffered from a disturbance of the left eye. There had been pain, redness, and gradual loss of vision of this eye. In the early part of 1920 the family physician had obtained a positive Wassermann reaction on account of which the patient had received persistent antiluetic treatment consisting of fifty mercurial inunctions, internal medication and many injections of arsphenamin. During this treatment the left eye became steadily worse. When she consulted Dr. Thompson on February 2, 1921, she was depressed from having been told that the left eyeball should be removed. At this time the right eye was painful and its vision was becoming cloudy. The vision was R. 20/70, L. light perception. There was marked circumcorneal injection of the left eye; the cornea was rough, hazy, vascularized, and infiltrated with minute grayish masses; the anterior chamber was shallow; and there was a light yellow mass 4.5 by 3 mm. in diameter in the lower outer quadrant of the anterior chamber. This mass lay between the 90° and 150° meridians, and extended from within 1 mm. of the corneoscleral junction to the pupil, which was partially covered. It was in contact

with the cornea and merged with another, much smaller mass at the upper outer border of the pupil. The margins were sharply defined, the surface regular and free from blood vessels. The iris was covered with yellowish exudate, and there was an anterior synechia above. The pupillary space was filled with old exudate. The right eye was very irritable, and the cornea was slightly cloudy from minute gray deposits on Descemet's membrane. No change could be made out in the right eye, the pupil of which was clear and reacted to light and accommodation. No pathology could be discovered in the fundus. The patient was underweight and had a temperature of 99.2. Skiagraphs of the chest and teeth were said to be negative. A culture showed streptococci in the tonsils.

A subcutaneous injection of old tuberculin produced a marked reaction in each eye, especially the left, which became so painful the night after the injection that the patient was unable to sleep. The right optic disc was found to be swollen and highly colored, but this condition cleared up in four or five days. In the course of a few weeks, under rest, proper diet, tonics, local treatment of the eyes, and several injections of old tuberculin, the patient's general health improved, the right eye became distinctly clearer, and the left eye showed a change in the color of the iris and a marked decrease in the large amount of exudative material.

DISCUSSION. J. A. Patterson, Colorado Springs. The patient probably has a congenital syphilis with a tuberculous infection. There may be a tuberculous infection in the tonsils. The case illustrates the advisability of giving very small doses of tuberculin to start with, even for diagnostic purposes.

Edward Jackson, Denver. The look of the case to me is that it is one of tuberculosis all thru. There is nothing about the cornea suggestive of a parenchymatous syphilitic keratitis and everything about the case can be explained on the basis of tuberculosis.

Magnet Extraction of Wire Embedded in Iris.

H. M. THOMPSON, Pueblo, reported the case of a man aged twenty-two years who had come after being struck with a

piece of baling wire in the right eye. The patient did not think that the wire had entered the eye. The eyelids were swollen, there was pus in the cul-de-sac, the cornea was cloudy, and there was hypopyon to a depth of 3.5 mm. In the upper inner quadrant of the cornea, at about 3 mm. from the corneoscleral junction, was a wound 2.5 mm. long. Higher up in the anterior chamber was a round yellowish mass of exudate about 3 mm. in diameter, in the center of which there seemed to be a black spot. On applying the giant magnet to the eye the mass, together with the iris, was pulled toward the cornea. After several unsuccessful attempts at dislodging the foreign body from the mass, the eye was opened at about ten o'clock in the corneoscleral junction, a spatula was placed on the iris near the mass, and application of the magnet to the cornea this time freed the particle from the iris. The foreign body was withdrawn by holding the magnet in contact with the spatula. Four days later the hypopyon had disappeared and the cornea was almost entirely clear.

WILLIAM H. CRISP,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

February 21, 1921.

DR. E. K. FINDLAY, in the chair.

Bilateral Traumatic Abducens Paralysis, Tendon Transplantation.

DR. H. W. WOODRUFF reported the case of a man, 63 years old, who was seeking relief from a marked paralytic convergent squint in both eyes, and gave a history of having fallen from a street car seven and a half years before, striking on his left outer and upper orbital wall. Following this accident he was unconscious for six hours and saw double on recovering consciousness. There was also a history of a primary syphilitic lesion fifteen years ago, and a four plus blood Wassermann reaction thirteen months ago.

Examination on admittance showed a convergence of 55 degrees in each eye. The right eye could not be abducted from its position of convergence and there was no outward movement what-

ever. The left eye could be abducted as far as the median line. There was marked contracture of both internal recti muscles. The pupils were 3 mm. in size, with sluggish response to light. Blood and spinal fluid Wassermann reactions both negative. Both discs were somewhat atrophic; some of the retinal arteries were sclerosed. R. V.=0.8; L. V.=0.6 — 3.

Neurologic examination revealed an Argyll Robertson pupil, much diminished knee jerk, some loss of coordination of the lower extremities, optic atrophy and bilateral abducens paralysis, and blood Wassermann plus. A diagnosis of tabes dorsalis was made and advisability of operation on the eye muscles was considered doubtful.

On December 31, 1920, transplantation of the outer halves of the superior and inferior recti muscles to the insertion of the external rectus was performed, with resection of the tendon of the internal rectus. This resulted in a slight overcorrection with abolition of convergence and adduction in the left eye, but with considerable abduction.

On January 21, 1921, the same operation was performed on the right eye, except that the internal rectus was simply tenotomized, no portion being resected. This produced no overcorrection in this eye, and no abduction beyond the median line.

The essayist considered the case interesting because it was rare to have bilateral paralysis of the abducens, unilateral paralysis of the muscle being the most common of ocular palsies. Secondly, while it is a case of tabes with positive luetic findings, there was a definite onset within a few hours after a serious head injury. Also, because a good result was obtained by tendon transplantation of the outer halves of the superior and inferior recti muscles, which could probably not be obtained in any other way.

The literature of similar cases of bilateral abducens paralysis following traumatism was reviewed.

The patient had been kept under observation since November 26, 1920. The condition at the time of presentation was as follows: Vision in each eye exactly the same as when admitted. Right eye

straight, no strabismus; no abduction but normal adduction, the divergence and loss of adduction being due to the resection of the internal rectus. Fields of vision the same as when admitted. No double vision.

The author was convinced that this operation offered something in the treatment of incurable paralysis, whatever the etiology may have been.

DISCUSSION. Dr. William H. Wilder said the case Dr. Woodruff mentioned as having been presented some five years ago had recovered. Three or four months after presentation the parents wrote that the child had acquired the power of moving the eyes outward. If recovery was complete in that time it probably meant that the nerve had been pressed upon by a blood clot, and confirmed the suspicion that such was the cause of the paralysis. He had never seen the case since but thought if recovery was complete at that time, it was probably permanent.

Dr. Wilder was interested in the picture of the woman that Dr. Woodruff passed around with the eyes turned in to a great extent. Had he known that this was to have been presented he would have offered a companion picture. That patient subsequently came to him for treatment at the Eye and Ear Infirmary and he operated upon her. It was extremely difficult to get the eyes outward at all. The picture showed the contracture of the converging muscles, which was so great that looking at her from in front, one could see only a small segment of one cornea and about one-third of the other, and she could see a very little thru the slightly exposed slit of the pupil. The operation was very difficult because, as Dr. Woodruff had stated, the contracture of the muscle was so great and there was considerable cicatricial tissue because others had attempted to dissect up the internal rectus. It was possible to get hold of what remained of the internal rectus and forcibly abduct the eye. The external rectus was then exposed and at least one and a half cm. of the tissue and the muscle of the external rectus was excised, and he was able to fasten it firmly to the stump of the external rectus by means of a suture similar to that used by Reese. In this way

the eye was made useful and subsequently he operated on the other eye, with a fair degree of success. Several months later he received a letter from the patient telling of her being able to use her eyes, and one was quite straight.

Dr. D. T. Vail, of Cincinnati, Ohio, stated that the last time he attended a meeting of the Chicago Ophthalmological Society, Dr. Clarence Loeb presented an excellent paper on strabismus and since then he had learned a few additional facts about strabismus that had altered his views somewhat. He called attention to the congenital type in which the patients were born with crossed eyes. There seemed to be congenital paralysis of the sixth nerve on each side which was usually discovered at a very early age. These patients all "cross fired" in the act of seeing. To fix objects on the right they utilized the left eye and in fixing objects on the left they utilized the right eye. If told to look at Mr. Smith on the right side he will not move the eyes at all but will use his convergent left eye to "fix" Mr. Smith on the right, and if then told to look at Mr. Jones on his left side he will still not move his eyes but will shift his attention, using his convergent right eye. The vision in such cases is usually normal in each eye. The convergence is striking and neither eye will pass beyond the median line in the attempt to direct the eyes toward the temple side. The patient automatically shifts his fixation attention from the left eye to the right eye as the object is moved past the center, and vice versa. This type he considered very interesting and altogether different from the case reported by Dr. Woodruff.

The late Dr. Jesse Wyler, of Cincinnati, reported in the Ophthalmic Record some years ago, the case of a child born without power to rotate the eyes outward, in which Dr. Vail had thought it necessary to do an heroic operation to get parallelism. Being somewhat alarmed about that, the parents took the child to see Dr. Wyler, who thought he could do a simple operation that would be sufficient. He did a simple tenotomy of one of the internal recti muscles and achieved a perfect result. When the case was reported Dr. Vail recognized it as being the one he had seen, so he learned that

in the congenital cases of this type it is not necessary to resect any of the muscles, such as was done in Dr. Woodruff's case.

Recently he saw a young child with marked strabismus and with no power to rotate the eye beyond the middle, on which he performed a simple subconjunctival tenotomy of the internal rectus and applied a scleral stitch to the tissues at the limbus and anchored the eye to the external canthal ligament so that it stood divergently. He left the stitch in for three days and then simply cut the thread, allowing the eye to resume a median position, which it naturally did. The eyes remained perfectly straight; had he done the heroic operation described by the essayist which he had formerly considered necessary, he would not have had such a good result.

Dr. Vail thought Dr. Woodruff's paper made the subject larger than it was formerly thought to be, because he had introduced another form of strabismus than was usually classified in the list of types. The strabismus reported frankly followed traumatism and the citations of similar cases reported in his paper were also entirely traumatic, and so the interpretation must be along the line of the traumatic idea. He thought in these cases a fracture of the skull at the base caused complete loss of function of both sixth nerves. There was another clinical finding which should perhaps have been dwelt upon and that was the presence of central scotoma, and atrophy of the optic nerve, which Dr. Woodruff did not say much about.

Dr. Vail considered the central scotoma and sectional atrophy of the disc as confirmatory evidence that the man had sustained a fracture of the sphenoid bone at or near the apex of the orbit.

Referring again to the cases of congenital bilateral paralysis of the sixth nerve, Dr. Vail believed that such patients usually had emmetropia and perfect vision in each eye. He did not know whether much work had been done to determine what caused the double abducens palsy; but in three of his cases he learned that the children had had an instrumental delivery at birth, and his inference was that hemorrhage had occurred in the region of the sixth nerve,

its trunk or its center, caused by the forceps crushing the skull in the act of delivery. He thought ophthalmologists should pay more attention to such traumas and instead of thinking of congenital lesions think of hemorrhagic or traumatic lesions, occurring along the lines of the nerves supplying the eyes. Such cases were not strictly congenital from an embryologic standpoint but rather incident to birth traumas.

Dr. E. V. L. Brown called attention to the fact that Professor Fuchs had read a paper before the American Ophthalmological Society in 1911 on central scotoma in tabes and thought this might well be in line with the conception of this case as one of tabes, and not necessarily one of trauma to the base of the skull. Then, too, there was the diagnosis of tabes by two good neurologists. Fuchs discussed 3 cases, stating that they were 3 of 6 he had had, and said there were others in the literature. Dr. Brown had been on the lookout for such cases but had never encountered one, unless this case was one.

Dr. Woodruff, closing, believed with Dr. Brown that the case was one of tabes; but that the immediate cause of the paralysis was the injury. In Dr. Woodruff's opinion the most important factor was the result obtained by the operation of tendon transplantation. Whether this operation should be used in all cases of paralysis was open to question. Other operations, as Dr. Vail said, might be better in other classes of cases, but up to 1917 he had never been able to secure a permanent result in any paralytic case. He could get a temporary result, but in a short time the muscle stretched out again and the immediate result was lost.

In the cases reported at the A. M. A. meeting in 1917, good cosmetic results were obtained. He had had three other cases, the one presented at this time being the fifth case operated on by transplantation. If too much resection of the internal rectus muscle was done there was danger of overcorrection.

Coronary or Wreath-shaped Cataract.

DR. ROBERT VON DER HEYDT spoke of this as a common form of progressive cataract occurring in adults.

Cataract is defined as an opacity of the

lens or its capsule. The capsule in itself remains transparent and an opacity only occurs if epithelium proliferates or pathologic products deposit themselves thereon; or if by virtue of the retarded resorption of embryonic tissues they present elements which may more or less interfere with capsular transparency. It would simplify matters if the term cataract would be limited to describing opacities of the lens proper.

These latter may be progressive or have to a degree become stationary. Among the socalled stationary cataracts are the various forms of congenital cataracts, also that type of lamellar or zonular clouding called perinuclear cataract, which may be present at birth or progresses in infancy.

A new form of lens clouding exposed by the slit-lamp in combination with the binocular microscope is composed of small chalky, punctate and woolly concretions on and within the axial area of the anterior nuclear surface. This lens change does not lower visual acuity and may be found in 25% of all individuals. It is situated approximately at the site of the original splitting off of the lens vesicle from the epiblastic layer, and is formed at the time just following this separation.

Among the progressive cataracts we have opacities of the lens such as cataracta complicata, which is secondary to other intraocular changes, senile cataract and traumatic cataracts in their varied manifestations, the rapidly progressive lens clouding seen in diabetes and the one which is here described in greater detail.

This form is called coronary or wreath-shaped cataract by Vogt, and is found to be progressive in nature and quite commonly found in adults.

This type of lens opacification formerly was in part called cataracta punctata and also cataracta coerulea or viridis, on account of its blue-green color and was considered quite rare. It originates in the periphery in a zone at the junction of the middle and outer third of the radius of the lens; that is, the opacities are in a thin flat layer and concentric anteriorly and posteriorly with the nuclear surface.

The opacities in their incipiency are club-shaped, the rounded end showing an

abrupt termination axialward, anteriorly and posteriorly, while the other end is lost in an irregular manner toward the lens equator.

In the course of years or decades these club-shaped flat, thin opacities increase greatly in numbers, and the axial zones of the lamellae involved are in addition occupied by faint round or oblong halos of opacification. There may be years of progression without a decrease in the visual acuity, because the pupillary lens area is hardly ever involved. In very advanced cases this type of cataract may be diagnosed by focal illumination with the ophthalmoscope, if the pupil is sufficiently dilated.

In cases which have progressed to this extent the slit-lamp in conjunction with the corneal microscope discloses a vast forest of club-shaped opacities surrounding a comparatively clear lens center in a wreath or garland-like manner. Scattered among these opacities are punctate and linear irregular dots as well as faint circular clouds, the latter especially situated in an axial direction, both anteriorly and posteriorly. Incipient types of this form of cataract have not alone been found in adults but also in senility and at times combined with senile lens changes.

Coronary or wreath-shaped cataract is considered extremely hereditary and has been found in many members of one and the same family. Its heredity is considered synchronous or occurring at the same period of life. As it hardly involves visual acuity it cannot biologically possess a tendency to hereditary elimination. For its detection complete medicinal mydriasis is necessary.

Within the last three months I have found six cases of this form of lens clouding in individuals in my office practice. It may therefore be placed as second in frequency of occurrence to senile cataract.

Case 1. S., male, age 36, vision normal. Very advanced case, shows faintly in focal light with the ophthalmoscope.

Case 2. M., male, age 30; vision normal. Right eye a few club-shaped opacities. Left eye 10 or 12 scattered in lens periphery.

Case 3. Male, age 37; half of a hundred peripheral flat linear atypic opacities. This form bears some relation to

coronary cataract because occurring within the same lens area.

Case 4. Elderly woman; several typical club-shaped opacities in combination with incipient senile cataract.

Case 5. Dr. M., age 40. Left eye especially shows most advanced typical form of coronary cataract, visible with the ophthalmoscope. The right a few, invisible in focal light with the ophthalmoscope.

Case 6. Mrs. B., age 46; when 31 years old, 16 years ago I refracted her for the first time under a cycloplegic. I then recorded no lens changes. The vision was practically normal, a small amount of myopic astigmatism.

Ten years ago at a subsequent examination the visual acuity and refraction were the same and she presented a faint circle of fine dots in the lens periphery, which I at that time, from their circular location, diagnosed as an aborted type of lamellar or zonular cataract with only the so-called "riders" visible. I was satisfied at the time that I had overlooked this lens change at the time of the first examination six years previously.

Mrs. B. is now 46 years old and since the last examination under cycloplegia, 10 years ago, shows a very decided progression of the peripheral lens clouding, by focal examination with the ophthalmoscope.

The slit-lamp presents a vast number of typical club-shaped and other opacities in the periphery of the lens and thereby this most interesting type of recently recognized cataract may now be properly classified.

The visual acuity now is reduced to 20/100 and 20/120, due to myopia of 1.25 and 1.50 D., respectively, under cycloplegia. With glasses the vision is normal.

As the age for the progression of myopia in the usually accepted form of the term had long passed in this patient, it must be concluded that this increase is due to a swelling of the lens substance consequent to the decided increase in the peripheral lens changes within the past ten years, which latter are now so plainly to be seen by focal illumination.

We therefore have in coronary, or wreath-shaped cataract, a very common progressive, hereditary, peripheral lens

clouding occurring in adults, and may now so classify it as a definite clinical entity.

Unilateral Facial Hypertrophy.

DR. E. V. L. BROWN presented a preliminary report on Harry F., aged 4 years, who was brought to the clinic on February 3, 1921, with the history that the left eye had been prominent for some time. Examination revealed a ptosis of the thickened upper lid and a marked prominence of the entire left side of the fore part of the skull. The patient was referred by Dr. D. B. Phemister, of the Presbyterian Hospital, whose report was as follows: "The boy has a classic case of unilateral facial hypertrophy, with a suggestion that later in life there will be hypertrophy of the entire left side of the body. I found on examination that the left leg is about one-half inch longer than the right. The skin of the body contains numerous pigmented patches, one of which is larger than a dollar. This change is fairly constant in hemihypertrophy and localized giant growth in different parts of the body. It is similar to the pigmentation which occurs in von Recklinghausen's neurofibromatosis.

After careful X-ray examination Dr. Hubeny reported: "The Roentgen examination shows an increased vertical diameter of the right orbital cavity; enlargement has taken place particularly at the lower margin. There is an increased density over this region; also, the temporal region adjoining this density is suggestive of an increased soft tissue growth rather than bone. The floor of the orbit is quite difficult to trace, and it appears as tho the malformation or new growth may extend into the nasal cavity. This case will be studied further and reported more in detail at a later meeting.

DISCUSSION. Dr. D. T. Vail asked if a roentgenogram had been taken of the sella turcica and if it showed any enlargement.

Dr. Brown, in replying to Dr. Vail, stated that Roentgen examination of the head showed an increased vertical diameter of the cavity, enlargement particularly at the lower margin, and increased density of the region. No enlargement of the sella turcica was seen.

ROBERT VON DER HEYDT,
Corresponding Secretary.

ROYAL SOCIETY OF MEDICINE. SECTION ON OPHTHALMOLOGY

Friday, February 11, 1921.

President, DR. JAMES TAYLOR.

Commotio Retinae with Extreme Edema.

MR. F. A. WILLIAMSON showed a boy aged 15 years, who six days ago received a blow from a suspended rope in the right eye, and it was immediately followed by loss of sight in that eye. He was first seen four days ago, and during the interval the edema had decreased a good deal. The macula was of a reddish-brown color, and there were two horizontal folds in the retina. He raised the question as to whether the concussion alone could account for all the edema present. When the eye became more quiet, some of the obscure features might be cleared up.

DISCUSSION. Mr. J. B. Lawford said that but for the definite time association of the injury and the edema, he would have suspected that the concurrence of the two conditions was mere coincidence. If there had been rupture of any important vessel, the hemorrhage would have been evident. The folding of the retina was very striking.

Mr. Leslie Paton said that when he first saw the case it presented almost the typical picture of central embolism of the retina. It was still likely there might be blockage of a vessel, the result of the concussion, tho he had never seen so much edema as a result of simple commotio. There might be a tearing of a nerve which affected a vessel and the hemorrhage had not come forward.

Dr. G. Mackay referred to a case which followed a blow from a tennis ball, and agreed with Mr. Paton's suggestion on the present case.

Artificial Eyes and Lids Attached to Spectacle Frame.

MESSRS. OLIVER and JACKSON, attached to the Sidcup Hospital for Deformities, gave a remarkable demonstration of a facial improvement brought by their imitation of the appearance of the normal eye on the spectacle frame of those who during the war had received wounds of the orbit resulting in evisceration. They were highly commended by all the speakers.

Corneal Loupe.

MR. BASIL T. LANG showed an ingenious corneal loupe for removing, unaided, a foreign body from the cornea. At Mr. Holmes Spicer's suggestion, he had added a transilluminator device.

Scotometry.

MR. BASIL T. LANG demonstrated his scotometer, for which ordinary unprepared paper could be used, and the observer could watch the patient the whole time. He also read a paper on the subject of Scotometry. He said that in scotometry one was concerned with more or less blind areas, surrounded by more or less healthy seeing retina, and usually dealt with areas within 40° of the fixation point. It only differed from perimetry in involving a more detailed examination. Two types of scotomata were recognized: absolute, and relative, the latter when an area of the retina, while able to appreciate brightly lighted objects, was unappreciative of certain colors or gray.

Among the points to be considered in determining the size of a scotoma were: illumination, size of the object, color of the object, color of the background, distance of the object, scale and size of the chart, and method of making the observations. If quite a small object were brilliantly illuminated, it might be visible over an area in which a less bright but much larger object could not be seen. In arriving at scotomata, therefore, the light used should not be too brilliant. Direct bright sunlight should be avoided, especially as natural light varied in intensity and color with season. No standard of artificial illumination had yet been agreed upon, but that from a single carbon filament lamp was quite suitable for this purpose.

The size of the object should be measured in terms of the angle it subtends, not by the length of the edge. If using a small object, the patient should be in the best position to see it, and if presbyopic, he should be wearing his correction. Green was less easily seen than red, red than blue, and blue than white. There should be a marked contrast between the color of the object and the background, and the latter should not reflect light. The question of the distance at which the observations should be made was a

controversial one; but if working very close to the patient it was difficult to move the object sufficiently slowly to give the patient time to form and convey his impressions. Quite accurate observations could be made at one-third of a meter distance. The scale and size of the chart were matters of personal convenience.

There were many methods, and he laid it down that a good method should be easy to employ, should give accurate results, should enable a permanent record to be made easily, and should enable the observer to watch the patient during the whole examination, to counteract eye wandering. He proceeded to describe and demonstrate his scotometer, and to discuss the features of other makes.

Possibly a patient with a high hyperopia might be the subject of increased intracranial pressure, and then arose the question whether the swelling of the disc was physiologic or pathologic. It was probably the former if the blind spot, when determined with a dull green, was no larger than with a brilliant white light. In some cases of tobacco amblyopia and of retrobulbar neuritis scotomata for green and red or for green only, might be found; but the chief purpose of scotometry was to determine an increase of the blind spot in suspected glaucoma.

DISCUSSION. Mr. Bishop Harman contended that it was an advantage to be unconscious of the progress of delineating the scotoma until it was completed, as the mind might otherwise be influenced by what was expected. Every effort should be made to exclude the personal equation, and that had been his aim in his own scotometer, which did also enable the observer to watch the patient.

Dr. A. H. H. Sinclair (Edinburgh) referred to the work of previous observers in this field, especially Bjerrum, Rönne, Walker (of Boston), Traquair (Edinburgh) and himself. All those observers realized the importance of using a very small test object. He thought the screen should be at a sufficient distance to so enlarge the scotoma that its details could be studied. The scotoma of interest in early diagnosis was the relative one.

Late Infection After Sclerostomy.

MR. T. HARRISON BUTLER (Leamington) read a paper with this title, opening with a historical sketch of the work of von Graefe, Grosz, Lagrange (who discovered the first method that could be relied on to produce a filtering scar), Herbert, Evans and Allport, Holth, Free-lan Fergus, Elliot. Mr. Butler said the conclusion was that the modern fistulizing operations were more efficient in reducing hypertension than was iridectomy, but that the danger of late infection was a serious offset which had deterred many from performing sclerostomy, driving them to older but less efficient procedures.

He had himself treated eleven eyes the subjects of such late infection, and some of the patients had had a second or a third attack. These tragedies caused him to abandon sclerostomy and revert to iridectomy. But the results of a series of cases were so futile that he reverted to trephining, and a comparison of his later results so completely vindicated the fistulizing method, that he did not propose to again perform iridectomy for glaucoma simplex. His statistic gave 45% of successful iridectomies, as against 75% of good results from sclerostomy. During 1918-9 he trephined 40 eyes for glaucoma simplex, and until recently all had been successful. Two had reappeared with raised tension, and had been trephined with success.

On reviewing his cases over the last five years, he found all the late infections had followed the trephine operation and Holth's punch operation. He discussed a number of informing cases in detail. It was obvious, he said, that the scar left by the punch was far more vulnerable than was the trephine scar; probably there was more bruising. A buttonhole was a serious menace, but in some cases the conjunctiva was so friable that it might tear. The Holth operation belonged to the past. He thought hypertony was one of the conditions fa-

voring late infection. In many of his unfavorable cases alcohol had been a factor. When he knew staphylococcus albus was obtainable from the conjunctival sac, he refused to operate.

In order to avoid late infection he thought the operation could not be regarded as an easy one. A perfect technic should be cultivated, and, consistent with good work, the operation should be done as quickly as possible. The flap should include all the tissues, and should not be bruised. Any local septic focus should be searched for. As an antiseptic lotion for use all the time, he advised a 1 in 10,000 solution of oxycyanid of mercury, used nightly in an eye bath.

DISCUSSION. Mr. S. H. Browning asked whether the eyes were examined bacteriologically before operation, and if so, by what method. If by Elschnig's method, that did not receive general approval. Pneumococcal infections in the eye were quite common. The presence of pus was apt to be deceptive, and should not be the only thing looked for, as eyes apparently healthy were found to contain pneumococci, streptococci and even staphylococcus aureus, in numbers to warrant postponement of the operation.

Mr. Leighton Davies (Newport) emphasized the importance of a sufficiently thick flap; a thin one might lead to late infection.

Mr. M. S. Mayou agreed that a thick flap was an important protection against infection. Another protection was the amount of fluid leaking from the anterior chamber thru the trephine hole. He had had only one case of late infection after trephining; he had seen two others, and in all, recovery was good.

Mr. Harrison Butler (in reply) agreed as to the adoption of good methods of ascertaining whether the conjunctival sac was sterile, but for practical purposes he used a 48-hour culture on agar.

H. DICKINSON.

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THE DECENTERING OF CORRECTING LENSES.

All who have studied the action of a lens know that at a single point, the optical center, the two surfaces of the lens are parallel. At all other points the surfaces are inclined toward each other; the optical center being the base of the prism for a convex, or the apex of the prism for a concave lens. When the action of a prism has been mastered, that of a lens is easily explained by the conception of a series of prisms, starting at zero at the optical center and increasing in strength as that point is departed from; so that the prism strength of the lens at any point is proportioned to the curve and the distance from the optical center. But there are certain practical points in the prismatic actions of lenses which are not so generally understood, altho they have been set forth in the literature.

The prescribing of decentered lenses to obtain prismatic effects can replace with advantage the formal prescription of prisms, in all cases where the lens used is strong enough to give the desired

prism effect within the boundaries of the mounted lens. Thus if the 1 D. lens were 40 mm. in its horizontal diameter, it could be decentered 20 mm. and thus give the effect a 2 centrad, or 2 prism diopter, or (almost exactly) a 2 degree prism. If the lens were only half as strong, placing the optical center at the extreme edge would only give half the prism strength. And with weaker lenses only slight prismatic effects can be thus obtained. With stronger lenses, such as are usually worn for presbyopia, the effect of prisms quite as strong as can usually be worn can be obtained by decentering. Prismatic effects required for hyperphoria, and often those needed for hypertropia, actual vertical squint, can be obtained by decentering one lens up and the other down.

In supplying a proper decentered lens, the optician will often have to grind it as he does the lens ordered combined with a prism. This is merely a question of the size of the block of glass or blank from which the lens is ground. To carry the optical center to the edge of the finished lens, the surfaced block from which it is cut must have double the di-

ameter of the finished lens. Blocks of this size would generally be a waste of glass, and when a sufficiently large one is not available, one surface must be ground at an inclination to the other, as when a prism is prescribed. But in any case, the accuracy with which the prescription has been filled can best be known by measuring the decentering—the distance from the optical center of the lens to the point at which the visual axis will pierce it, when the patient looks thru it with the eyes in the primary position.

Undesired decentering must be guarded against. Generally good opticians are very careful about it, noticing and explaining about a barely perceptible decentering that is of no practical importance in a lens of moderate strength. In general if both lenses are decentered equally in the same direction, no harm is done. The slight turning of both eyes, or turning of the head, from the position they would otherwise occupy in looking at a particular object falls within the limits of unconscious adjustment, in the continual movements of fixation. When reading thru 3. D. convex lenses at one-third meter, the decentering of each lens 10 mm. to the right would be balanced by holding the book less than 6 mm. (one quarter inch) farther to the left.

On the other hand decentering that disturbs the relation between the two visual axes must be guarded against. Decentering both the 3. D. lenses toward the nose, the amount mentioned, would relieve the convergence from fixing on a point 33 cm. away to the equivalent of fixing on a point about 50 cm. from the eyes, the exact effect varying with the width between the centers of rotation. But it is undesired vertical departures of the centers from the same level or relation to the base line that works the most harm. This is because of the comparatively slight power of the eyes to deviate vertically, the power of sursumduction being commonly only one quarter of the power of abduction, and one-tenth the adduction. To have one center even 1 or 2 mm. higher than the other, with lenses of moderate strength, may be a cause of serious discomfort and failure to give relief.

To secure exact centering vertically is the most constantly important object of accurate frame fitting, the most frequent cause of the needed readjustment of frames, the most common defect of cheap spectacles. Every patient needs to be warned to keep his or her glasses level before the eyes; and it is well to have the patient learn by looking thru the upper edge of his glasses to judge whether they are level, and to make the slight necessary adjustment to get them so.

The decentering of lenses is most commonly useful in connection with the correction of presbyopia. After middle life it is very common for patients to show some weakness of convergence. At the same time, many use their eyes more for reading than they have done when younger. Hence the decentering of convex lenses in, so as to lessen the requirements for convergence, gives relief; which often extends very materially the time that the eyes can be used for such work, without undue fatigue.

Another class of cases helped by the decentering in of convex lenses, are those hyperopes who also have a marked exophoria. Even tho their eyes are suffering from excessive demands on their accommodation, convex lenses prove unsatisfactory because the effort of accommodation helped to overcome the tendency of the visual axes to diverge; and when this help is removed they suffer more with the excessive effort required for convergence.

Myopes too, who have marked exophoria get great relief from the decentering outward of their concave glasses. In hyperphoria with much ametropia it is easy to decenter one lens up and the other down, so as to correct any degree of such tendency. In the large class of cases in which hyperphoria is constant but of low degree, the decentering of one lens offers a simple method of giving help, when one might hesitate to order even a weak prism added to a correcting lens.

E. J.

TRIFOCAL LENSES.

These have been used occasionally to meet the special needs of certain patients; but it is probable that they are capable of usefulness in a much wider

field. As Dr. Spengler has indicated in the first article of this issue, their fitting raises additional problems to be worked out by the oculist and the optician, with regard to the areas of the different parts of the glass, their placing before the eye and their centering. But these are practical problems requiring simply accurate measurement under working conditions and the application of common sense.

For general use probably the dimensions suggested in the article mentioned are about the best; but they may have to be modified to meet the special needs of the patient's work. A railway mail clerk, after trial of other forms, chose one in which the intermediate strength came across the middle of each glass as a narrow rectangle, its long sides placed horizontally. Another patient has required that this intermediate zone be made quite as broad or broader than either of the other portions.

When the glass is composed of three separate pieces, cut out of different lenses, the centering can be easily arranged to produce the minimum of undesirable prismatic effect. The superimposed films, described in the above article, are also capable of such centering to a very large extent. Even with the invisible trifocals, which have been produced in excellent shape in at least three of our larger American cities, undesired prismatic effects can be managed about as well as in the popular invisible bifocals.

Using two transitions in the strength of the glass, instead of one, we need to make each of the intervals in strength only half as great. Or one can be made even less and the other slightly greater than half when that is desirable. Even with complete presbyopia, where the patient needs for reading 3 D. convex added to his distance correction, the use of the correction with plus 1.5 for intermediate will give a very useful field, nearly at arm's length, in which many necessary things can be done with distinct vision instead of the intermediate blur.

Then during the period when presbyopia is coming on, a period often lasting 12 to 15 years, the intermediate glass will long prevent any space of necessarily unfocussed images. Patients some-

times reach the age of 60 with a full diopter of accommodation. With the addition to their distance correction of 1. D. for intermediate and 2 D. for reading, they can continue to get perfect focussing from infinity to one-third of a metre. Some surgeons have found the third or intermediate field most useful in operating. For several years the writer secured it by an additional pair of "operating glasses," of carefully selected strength and placement, that gave a desirable intermediate field, and at the same time added to the reading portion of his ordinary lenses power that was especially desirable for the more delicate operations on the eyeball.

E. J.

BOOK NOTICES.

Glaucome et Glaucomateux. Dr. Victor Morax, Ophtalmologiste de l'Hôpital de Lariboisière. Octavo, 368 pages, with 1 colored plate and 114 figures in the text. Paper back. Paris, G. Doin, 1921.

Is there any disease affecting the eye in which it is more important to take careful account of the general physical condition and health of the patient than glaucoma? Probably the more we learn about ocular disease, the more widely will we perceive its relations to general conditions. But among conditions in which the general ocular condition, the whole physical makeup and temporary general state of the patient must be considered, glaucoma will always be one of the most important. It is a happy thought to emphasize this in the title of a book dealing with glaucoma, and therefore necessarily with the glaucomatous patient.

It is a book that gives a good general account of its subject up to this time. It was founded on a series of conferences given at the Lariboisière. The first chapter gives a definition, the etymology of the word glaucoma, and a history of our understanding of the condition. The definition makes it practically synonymous with ocular hypertension. The history refers chiefly to Brisseau, Saint-Yves, Arrachart and Desmarres, and prints of the last two of these writers are here reproduced.

Chapter II deals with ocular tension and the methods of examining it. There is a full account of the tonometer of Schioetz, both of the instrument and the theory on which it is based. But apparently the epidemic of modified tonometers, that has invaded English speaking countries, has not affected France.

Chapter III discusses the physiology and pathology of the ocular tension, including an account of the angle of the anterior chamber and the intraocular blood vessel systems. Then come two chapters on the symptomatology of glaucoma, including an interesting discussion of the colored rings seen around a light. There is a color plate representing such rings, based on an autochrome photograph of the rings produced by light passing thru a glass plate sprinkled evenly with powder of lycopodium. Here, too, we find an account of the clinical method of Bailliart for testing the blood pressure in the retinal vessels, by watching the changes produced by a known pressure made upon the eyeball. There is also a discussion of the glaucoma cup and the anatomy of the head of the optic nerve bearing on it.

With Chapter VI the clinical forms and types of glaucoma are taken up, beginning with acute glaucoma. Later chapters discuss subacute and chronic, infantile, traumatic, accompanying intraocular foreign bodies, and secondary glaucoma, with a chapter on that associated with lesions of the crystalline lens. In Chapter XI, on secondary glaucoma, is found a description and a figure of a modified base for the tonometer, designed to render possible the use of the instrument when ulceration or deformity of the cornea renders the ordinary form of base inapplicable.

Chapter XIII takes up the diagnosis and prognosis of glaucoma; and Chapter XIV the treatment. In Chapter XV are discussed the special therapeutic indications of certain clinical forms of glaucoma, and the last chapter is devoted to a discussion of the etiology of glaucoma, an extremely attractive topic with which must be linked up its prophylaxis.

This book by Morax, which constitutes the second volume of his "library of ophthalmology," is a clear, practical, rather concise, well written account of its subject; which is today occupying a very prominent place in current ophthalmic literature. It brings us in close touch with the work in this department, of the living French ophthalmologists, and it gives excellent accounts of the recent glaucoma operations of Lagrange, Holth and Elliot. To all ophthalmologists who can read, or wish to learn to read French, it can be most highly recommended.

E. J.

Transactions of the Ophthalmological Society of the United Kingdom. Vol. 40, pp. 674. Illustrated. London, J. and A. Churchill.

The outstanding feature of this volume is the Decennial Index compiled by A. L. Clarke. This is a general index of all the contents of volumes 31 to 40, inclusive, of this series of transactions. It occupies 56 pages and no other equal number of pages add anything like an equal value to this series of volumes. Here are over two thousand references, arranged alphabetically by well considered topics and by authors' names; which will in a minute or two reveal whatever has been published on any particular subject in these transactions in the last ten years. As literature accumulates the value of good indexes rises rapidly. This is most clearly illustrated in this instance.

The most striking characteristic of these transactions is the large number of separate, brief, practical communications which they contain. This volume contains over 100 separate papers, many of them accompanied by the condensed discussion of them by their hearers. This is to be contrasted with the number of papers found in the last volumes of other Ophthalmological Societies using the English language, 33 for the American Ophthalmological Society, 15 for the Section on Ophthalmology of the American Medical Association, and 21 for the American Academy of Ophthalmology and Oto-Laryngology. It is the great number of com-

munications thus made available that gives special value to this index.

The added strength brought by union is illustrated in this volume, for the majority of the papers published in it were presented in the affiliated societies. There come from the annual Congress of the Ophthalmological Society of the United Kingdom 38; from the Oxford Ophthalmological Congress 8; The Midland Ophthalmological Society 23; The North of England Ophthalmological Society 6; The Irish Ophthalmological Society 24; and the Ophthalmological Society of Egypt 4. The newest addition to this list of affiliated societies, the Scottish Ophthalmic Club is not represented in the volume. From these affiliated societies the papers seem to have been carefully selected and compare well with those from the older organization.

The address of the President deals with the ophthalmic education of medical students, urging the Society to press these reforms: Each candidate for the license to practice, to attend an ophthalmic clinic for three months, and a final examination by ophthalmic specialists. A discussion on diabetes in relation to diseases of the eye occupies 44 pages. The opening papers are by Sir Archibald E. Garrod and Mr. R. Foster Moore. A second discussion, which occupies 75 pages, upon the prevention and treatment of ophthalmia neonatorum, was opened by Dr. Gibbon Fitzgibbon of the Rotunda Hospital, Dublin, and Mr. M. S. Mayou of London. Another extensive paper is the Doyne Memorial Lecture, given at the Oxford Congress by F. Richardson Cross, 35 pages on the nerve paths and centers concerned with sight.

Of the 8 plates in this volume, none are printed in colors. This absence of color plates is notable in a volume of this series, where earlier volumes have contained some of the best printed anywhere. But color plates, like everything else connected with printing, have increased greatly in cost; and the money, that might have been spent on one or two of them, may well have been put into printing this larger volume. It is the largest volume of trans-

actions this society has yet published; and in appearance and quality of paper and printing it conforms closely to its predecessors.

E. J.

National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Bureau of Standards Handbook Series. 64pp. Illustrated, Washington D. C. Government Printing Office.

This is the second of a series of safety codes, the first, the National Electric Safety Code, having been published in 1916. It first presents the general requirements and a classification of occupations that require eye protection. Then follow detailed requirements for each group of occupations, operating rules, and tests to insure that the various protectors will accomplish their purpose.

The rules laid down occupy nearly half the pamphlet. The remainder is taken up with a discussion of them, intended to assist in understanding the reason for them, to interpret them, and making suggestions for their carrying out. The devices here dealt with include protectors placed between the worker and the source of danger; goggles worn before the eyes; face masks that protect eyes and face; helmets that protect the head and neck, and hoods that also include portions of the shoulders and exclude dust and flying particles.

One who has to deal with industrial injuries to the eyes cannot fail to gain a better understanding of the conditions under which they occur, and the practical measures for preventing them from a careful study of this code. Its preparation has been supervised by a large committee on which state industrial commissions, engineering organizations, insurance companies and manufacturing corporations, including three optical concerns, have been represented, but no oculists. Containing matter outside the usual discussions found in ophthalmic journals and text books, it will on that account prove more valuable to ophthalmologists consulted about such injuries.

E. J.

CORRESPONDENCE. PSYCHONEUROTIC ASTHENO- PIA.

To the Editor: Your editorial on asthenopia was read with great pleasure, and you will pardon my comments. Asthenopia is perhaps often a psychoneurotic condition in children, boys and girls at school and college and adults in various occupations.

As a fair example, I give the history of my two sons and a daughter. At school at home they complained of their eyes. Careful examination without and with homatropin showed normal vision. All would accept a +0.37 spher. or +0.25 90° cyl. I told them nothing was the matter, and later when sent away to advanced schools warned them to be tolerant of any fatigue symptoms. In spite of this all insisted, after complaining by letter, on being allowed to visit an oculist in a nearby

city; the result was that all three were given either +.37 or +0.25 90° or +.25/90 for near use.

The cost of the glasses, railroad, hotel expenses, etc., was about seventy-five dollars—the oculists kindly not charging for professional services. All three wore the glasses a few months and afterward they were lost or regarded as junk. These cases are typical of thousands I see. Is it not a waste of money to order lenses for them? Some years ago a boy, about fifteen at school here with the same history insisted he could not study. His father was told there was nothing the matter with his son's eyes and he was taken from school and made to work. Several years after, having made good at college, he thanked me for advising his father as I did. The number of asthenopic eyes is increasing amazingly.

Very truly yours,
EDWARD F. PARKER,
Charleston, S. C.

ABSTRACTS

Brouwer, B. The Oculomotor Nucleus. Zeits. f. d. ges. Neurologie u Psychiat. Bd. 40.

Brouwer examined the brain of a woman who had shown during the later years of her life double-sided paralyses of ocular muscles, and slowly progressive optic nerve atrophy had appeared. The left trigeminus and facial nerves had shown symptoms of disease, and the knee-jerks and Achilles reflexes had disappeared. The section showed an aneurysm of the right internal carotid, which had pressed on the nerves of the ocular muscles behind the right orbit, had grown toward the left side and had pressed on the chiasma and the cerebral nerves of the other side. In the region of the oculomotor nucleus, the left large cell lateral nucleus was found intact, the right large cell lateral nucleus was much degenerated in its anterior part, diminution of cells was found in the front and middle third of the right lateral nucleus, the Perlia nucleus was partly degener-

ated, the Edinger-Westphal cell groups were normal. The left facial nerve was not changed, altho during life a facial paralysis had existed. The trigeminal nerve showed distinct changes.

Another case of double-sided ophthalmoplegia, caused thru a one-sided aneurysm confirmed anatomically does not exist in the literature. It is peculiar that the degeneration in the motor nuclei was so slight, and only found in the right nucleus. It is probable that the pressure on the right nucleus and root had been more intense and lasted longer. The section did not explain all clinical symptoms. The repeatedly found Babinski can be explained by pressure on the pons. Not explained are the facts that the reflexes in the lower extremities had disappeared, and that some disturbances of the sensibility in their upper parts were found. Probably changes in the lumbo-sacral region were present, perhaps also an

aneurysm, as one was found also in the corpus striatum.

Brouwer concludes, from the study of the literature and of comparative anatomic material, that his material gives a good basis for the opinion that the Edinger-Westphal cell group represents the sympathetic part of the oculomotor nucleus. He considers that the arguments against this Westphal theory are too highly estimated in the literature. Considering the different schemes which have been made to represent the position of the nucleus of the elevator of the upper lid, Brouwer agrees that this position is in the frontal part of the large cell oculomotorius nucleus of the same side. A clinically bilateral ptosis was present, which during the last part of life had been greater on the right side, anatomically a large disappearance of cells in the frontal pole of the right oculomotor nucleus and in the Perlia nucleus was found.

It is not so strange that the nucleus of origin of the levator should be in the frontal pole of the oculomotor nucleus, as many investigators have come to the conclusion that the nucleus of the superior rectus should be localized in the front part. From the reptiles on the levator appears, it receives its nerve from the branch of the oculomotor for the superior rectus. It can be considered to be split from the superior rectus, a phylogenetically younger part of it; and it is therefore very probable that its cells of origin are in near contact with those of the superior rectus.

Brouwer has examined a case which showed during life paresis of the internus and found a distinct loss of cells in the Perlia nucleus, which he considers to favor Knies' theory, that the convergence center is situated in this nucleus. Comparatively, he found that raphe cells appear in animals when the position of the eyes in the head makes convergence possible. These cells undergo a double change in anthropoid apes and man: they are much enlarged and they have extended more forward. The enlargement can be understood thru the higher significance of the con-

vergence function. The movement forward can be explained thru neurobiotaxis. These cells move in the direction of the Edinger-Westphal nucleus, that is in the direction of those cells, which serve for accommodation and narrowing of the pupil with the convergence. The Perlia nucleus is therefore nothing else than the phylogenetically younger part of the true raphe cells.

As a scheme for the oculomotor nucleus, Brouwer likes the best that of Bernheimer, with the exception of the median nucleus, to which Brouwer wishes to relate the convergence function. The internus has then a different group of cells for action with the other internus, and one group for the other functions. The raphe cells are as large as the cells of the lateral nucleus.

E. E. B.

Abadie, Ch. Forms and Treatment of Chorioretinitis. Ann. d'Ocul. v. 157, 1920, p. 321.

The forms due to exogenous infections have a tendency to get well, while those of endogenous origin recur more frequently and become graver. They appear chiefly in middle life. They are usually of syphilitic origin, hereditary or ancestral, affecting only the deeper membranes as a rule. The appearance of the fundus varies from small, numerous circumscribed foci to large white islands, sprinkled with numerous patches of pigment.

Sometimes the disease involves the optic nerve, causing atrophy. The appearance of the disc is characteristic. It is grayish, with ill-defined borders, and the arteries and veins are filiform, due to thickening of their walls. Chronic simple glaucoma and congenital hydrocephalus are also complications or sequels. Detachment of the retina is a more frequent result, and even in myopia, foci of retinchoroiditis will be found in the equatorial region, which certainly play a role in this condition.

The treatment is intravenous injections of cyanide of mercury, 10 to 12 injections followed by a rest of 2 to 3 months; then a new series, rest, etc.

The results are very good, even in cases apparently hopeless, but the treatment must be carried on for a long time, even years. C. L.

E. Cecchetto. Treatment of Gonorrhoeal Conjunctivitis with Antigono-coccic Vaccines. Arch. di Ottal. v. 27, 1920, p. 69.

Cecchetto reports his results in 59 cases treated from 1914 to 1919 by daily subcutaneous injections of vaccine. He had used instillations of antigenococcic serum, with good results, but found that its use alone would not produce prompt cures. With the vaccine alone, however, no local treatment being employed, he states that the majority of cases are cured in a few days, with no corneal complications.

He records only five corneal ulcers, of which four were developed when treatment began. One to seven injections produced a cure in most cases, but in a few ten to twenty were required. The accompanying vulvovaginitis or urethritis was also cured in most cases.

The best success was secured with Nicolle and Blaizot's vaccine.

S. R. G.

Bartels, M. Ocular Symptoms in Encephalitis Lethargica. Klin. M. f. Augenh. v. 65, 1920, p. 64.

Bartels found in his cases the following characteristic ocular symptoms: Ptosis, paralysis of accommodation, with pupils not correspondingly wide but partly impaired in their action, vertical paralysis of fixation, not horizontal. Occasionally there was nystagmus, impairment of vision, and in rare cases retrobulbar neuritis and sometimes exophthalmos. All were of favorable prognosis if the patient recovered. Bartels considers the disturbances as nuclear, arising thru the cerebrospinal fluid which penetrated into the surroundings of the Sylvian aqueduct, so that the superficial nuclei were damaged first. The earliest, most intense and most enduring phenomenon was the paralysis of accommoda-

tion. The 3rd, 6th and 7th nerves were most frequently affected; the 4th less frequently, and the 5th never.

For the differential diagnosis from cerebellar tumors, choked disc, preserved sensibility of the cornea and the sleepiness are of importance; from Wernicke's hemorrhagic polioencephalitis, the ptosis and sleepiness and in Wernicke's disease, the more total ophthalmoplegia; from epidermic tubercular meningitis, the wide pupils and iridoplegia and by lumbar puncture. In acute apoplexy due to arteriosclerosis; the apoplexy from the beginning, the simultaneous affection of the limbs and the further course, are determining. In patients with encephalitis lethargica, but presenting ocular symptoms, e. g., paralysis of accommodation and unilateral disturbances of pupillary reaction, the differential diagnosis from lues is very difficult.

C. Z.

Simón de Guilleuma. Treatment of Localized Infections of the Lids with Ion Zinc. Revista Cubana de Oft. 1920, v.2, p. 234.

Simón has been able to cure very rapidly cases of lid abscesses and other localized palpebral infections, by the use of the ion-therapy with *ion-zinc*. The electrolyte used is a solution of zinc sulphate one per cent strong, very pure.

The technic is as follows: after washing well the skin with alcohol, a piece of cotton with the warm solution is applied over the diseased region. On top is placed the electrode already prepared and covered with cotton, and all this is covered with a bandage. The electrode is then connected with the positive pole, while the negative pole is held by the patient in one hand. The current is put up to 2 or 3 m.a., during 30 or 60 minutes, according to the depth of the infection, and then the rheostat is retired with the same slowness as before. A very small number of sessions is usually needed. The skin over the region becomes red, and after some days there is some desquamation of the skin.

F. M. F.

Larsson, S. W. Acquired Atrophy of the Iris. Klin. M. f. Augenh., v. 64, 1920, p. 510, (ill.)

The left iris, of light yellowish brown color, of a woman, aged 47, showed on its temporal portion a large oval vertical opening, apparently the pupil. Its lower part extended to the limbus, where the iris was totally missing. Above this a small seam of iris formed the temporal border of the opening. The nasal portion of the iris, a crescent, was the best preserved part, forming as it seemed, the area of the sphincter, because it contracted upon light. It showed a slight eversion of the pigment layer. The remaining iris consisted of narrow strands which radiated from wider insertions to the above mentioned nasal crescent. The strands were composed partly of the dark brown pigment layer. Between the strands were complete defects thru which the illuminated fundus could be clearly seen. At the upper portion of the iris was a small coloboma. Excavation of the optic disc, tension 70. V., fingers at 2 m. The patient stated that she had not previously noticed such appearances of her eye.

A review of the literature shows a great diversity in the explanation of

the cases similar to Larsson's case, but in all a more or less marked corectopia existed. Larsson assumes for his case a congenital anomaly, viz., a corectopia or an atypical coloboma with corectopia. In consequence of traction by the relatively well preserved sphincter, or by shrinking of the sphincter, interrupted in its continuity, an atrophy of the iris took place with subsequent defects. The perhaps congenitally weakened iris might be torn in the portion opposite to the corectopia most exposed to mechanical influences.

This mode of development would be analogous to the congenital defects of the iris. Why, in a number of cases, it occurred so late in life may have been due to the increased tension, since glaucoma may at an early stage cause atrophy of the iris. The pigment layer could be seen in a lower plane and its defects, in their direction and appearance, did not completely correspond with those of the anterior layer of the iris, from which it was separated by the hypertension of the iris; because on account of its content of elastic and stronger dilator fibres it resisted the tension. Larsson sees in this a further support of the mechanical etiology.

C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu. Volunteers are needed in other localities.

DEATHS.

Dr. Heman H. Brown, a well-known ophthalmologist of Chicago, died April 10, at Orlando, Florida.

Dr. David Agnew Crawford, Guthrie Center, Iowa, died in Chicago, March 14, 1921, following an operation for carcinoma of the bowel.

Dr. J. Rohmer, Professor of Ophthalmology at the University of Nancy, died, February 11, at the age of 65 years. He felt severely the death of his two sons during military service in the late war, one by aviation accident the other by typhus. The latter, André Rohmer, had been chief of the Ophthalmic clinic at Nancy, had merited the war cross of the Legion of Honor, and died after the armistice while serving the repatriated prisoners.

PERSONALS.

Dr. G. P. Doyle has located in Berkeley, California.

Dr. John M. Wheeler announces the removal of his office to 30 West 59th Street, New York City.

Dr. Carl Fisher, formerly of Rochester, Minn., announces offices at 820 Baker-Dettwiler Building, Los Angeles, California.

Dr. Herbert L. Gans, after active service in the war, has resumed practice limited to diseases of the eye, with offices at 220 State street, Albany, N. Y.

Dr. Melville Black of Denver has returned from a two months' vacation in Honolulu. He was delighted with the islands and made the acquaintance of a number of ophthalmologists there who are on a par professionally with their confreres on mainland. He strongly recommends this trip to overworked ophthalmologists as a sure cure for all ailments resulting therefrom.

Dr. L. Koeppe, Privat Docent Ophthalmology, in Halle, has been asked by the medical faculty of the University, and by the Spanish Society for the Extension of Study in Madrid officially to give courses and lectures in the Spanish universities on "The Microscopy of the Living Eye," and to demonstrate the workings of the Gull-

strand slit-lamp. Koeppe will spend two months in Spain.

Dr. Casey A. Wood's letter sent to a number of his friends shows how it is possible for him to retire from his profession and find mental and physical employment and pleasure. So many retired physicians are unhappy and their lives shortened because they find it impossible to occupy their time in a satisfactory manner. This is not true with Dr. Wood; he is busier than ever, and yet employed in such a way that his life will be lengthened. He is contributing to science findings that are of great value, and his example is worthy of emulation.

Dr. Harry Vanderbilt Wurdeemann, Seattle, is in Washington and New York during the month of May. He gives a series of lectures at the Army Medical School, May 4 to 14, on "Injuries of the Eyes." May 11 he addresses the District of Columbia Society on "Bright's Disease and the Eye—the Relation of Ocular Lesions to Cardio-renal Diseases." May 16 he reads an essay before the Eye Section of the New York Academy of Medicine, on "Massage of the Eye for Relief of Iritis Adhesions, Optic Nerve Atrophy and Embolism of the Retinal Artery."

SOCIETIES.

The Chicago Polyclinic has a class of seven physicians who are taking postgraduate work in ophthalmology, this month.

The Illinois Society for the Prevention of Blindness in one week recently, obtained convictions of two midwives for failing to report cases of ophthalmia neonatorum. One was fined \$10.00 and costs, and the other one \$50.00.

The monthly meeting of the Kansas City Eye, Ear, Nose and Throat Club was held on April 21st. Papers were read by Dr. J. G. Dorsey of Wichita, Dr. T. E. Wyatt of Kansas City, and Dr. E. M. Seydell of Wichita. Dr. W. G. Gillett, Wichita, presented a pathologic report on Dr. Dorsey's glioma cases.

At the regular meeting of the Chicago Ophthalmological Society, April 18th, in a symposium on "Uveitis," Dr. Nelson M. Black, of Milwaukee, discussed the "Etiology"; Dr. Sanford R. Gifford, of Omaha, the "Pathol-

ogy," Dr. W. H. Wilder, Chicago, "Symptomatology"; and Dr. J. Loring, Chicago, the "Treatment."

At the Annual Congress of the British Ophthalmological Society, held in May, there was a discussion on "The Psychology of Vision in Health and Disease." The Bowman Lecture was given by E. Treacher Collins, on "Changes in the Visual Organs Correlated with the Adoption of Aboreal Life and the Assumption of the Erect Posture."

On April 18th, the section of ophthalmology of the New York Academy of Medicine was addressed, by invitation, by Dr. Lee M. Francis of Buffalo on "Surgical Treatment of Epithelioma of the Cornea with Report of Three Cases," and by Dr. E. C. Ellett of Memphis on "Corneal Sutures in Cataract Extraction" and by Dr. Karl Lindner of Vienna on "A Few Facts Regarding Infection of the Conjunctiva."

At the meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, April 21st, 1921, papers were read by Dr. Robert Scott Lamb, of Washington, D. C., on "Retinal Detachment; Suggestions as to Its Treatment," by Dr. Warren S. Reese, "Report of Two Cases of Cavernous Sinus Thrombosis"; by Dr. T. B. Holloway, on "Additional Cases of Snowball Opacities of the Vitreous," and by Dr. Burton Chance on "The Status of Color Vision."

In urging as many British ophthalmologists as possible to be present at the International Congress of Ophthalmology to be held in Washington next year, the British Journal of Ophthalmology points out the difficulties we will have at this time in securing anything resembling an international representation at the Congress. The Journal adds this significant statement: "It is not needful to dilate on the hospitality which the inhabitants of the United States show to all their guests. What is of greater importance to us in this country to realize is the vast amount of good work that is being done in ophthalmology in America."

MISCELLANEOUS.

A bequest of \$25,000 to the New York Eye and Ear Infirmary, by the will of Miss Elizabeth Southmayd, has recently been announced.

Dr. G. Oram Ring's obituary to his friend and preceptor, Dr. Samuel D. Risley, in the Bulletin of the A. M. P. O., is a scholarly tribute and will be much appreciated by all members of that order.

In the chemical laboratory of the University of Illinois a new local anesthetic has recently been produced, to which the name of Butyn has been given. It is a synthetic succinate, and from the reports of several ophthalmologists who have been giving it a trial for the past few weeks, it possesses certain marked advantages over cocaine. While it is only one-half as toxic as cocaine, its action is three or four times as rapid, and it has no effect upon the pupil nor the ciliary muscle.

With the aid of a gift from Dr. Adolph Barkan, emeritus professor of the Stanford Medical School, the University is gathering in the Lane Library of the medical school in San Francisco a collection on the history of medicine that will be equalled by no other Western institution. Dr. Barkan will give \$1,000 a year for the next three years, to which the university will be able to add from the income from certain Lane Library foundations \$1,500 a year, making a total fund of \$7,500, all of which will be expended on books concerning the history of medicine. Dr. Barkan himself, is now in Europe and he has employed an expert and has also gained the assistance of one of the most celebrated professors in Europe to aid him in getting together this collection. Dr. Barkan was professor of structure and diseases of the eye, ear and larynx in the medical school, and retired from active teaching in 1911. He has before this been a liberal benefactor of the medical school library, having given his own library, dealing with the subjects in his own special field, together with \$10,000 as a fund for the purchase of other books on these subjects. (Jour. of the A. M. A., April 23, 1921.)

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RESTORATION OF OBLITERATED EYE SOCKET.

JOHN M. WHEELER, M. D.

NEW YORK CITY.

The forming of a socket to hold an artificial eye by implanting a dermic graft pressed into the walls of the cavity on an appropriate form had been tried before; but reached its highest development thru work growing out of the great war. The writer's technic as here set forth shows the best development of this method. Read before the First Annual Session, Ohio Section, Clinical Congress, American College of Surgeons, Cleveland, April 1, 1921.

Loss of conjunctiva which results in obliteration of the eye socket is caused most commonly by burns, as by molten metal, acids and lime. Less frequently, it is occasioned by traumatism or by improperly performed enucleation of the eyeball. Recently many war wound cases have been operated on for socket obliteration. In dealing with the condition, the cause is of little consequence. The obliteration may be partial or complete, and restoration in all degrees of contraction has been considered a difficult task. The importance of the procedure cannot be doubted, for appearance of the individual, whether woman or man, counts for much. One cannot help being surprised at the insistence of the desire on the part of patients of all classes to wear prostheses after loss of eyes. Commonly a patient will submit to operation after operation for restoration of lost cul de sacs, in order to be able to carry an artificial eye.

In discussing the important subject, let me first refer to some of the methods that have been used or advocated, and then describe a method which I have evolved out of a considerable experience and adopted as the most satisfactory. Just how much is original and just where priority belongs is not of especial interest. The important thing is that by the method which I shall describe, one can permanently restore obliterated eye sockets, without adding any new deformity, and without too tedious an ordeal for either patient or surgeon.

The method can be given with confidence because numerous results justify it.

The well known method of Weeks¹, which calls for a large dermic graft from the inner surface of the arm for each cul de sac, enables the surgeon to give the patient a socket capable of carrying an artificial eye, providing the rather difficult technic is properly carried out. But considerable shrinkage occurs, with accompanying entropion, and many surgeons who have tried the method have been disappointed by almost complete loss of the new socket thru undue contraction. The procedure is tedious, especially as only the upper or lower cul de sac is made at an operation; and, if both upper and lower have to be restored, a period of weeks or months must pass between operations. Moreover, a successful result by the Weeks method is open to the criticisms applicable to all sockets made by the use of true skin—namely, that the tissue is too thick for an ideal lining, that the secretions of the glands of the dermis tend to make the socket foul, unless the patient is more than ordinarily intelligent and faithful in the care of the socket, and that after transplantation, the skin furnishes hairs which may grow to a surprising length if they are not epilated faithfully. Then, too, there is always the possibility that the arm wound will open up, and that there will be delayed healing.

Many surgeons have used in different ways small epidermic grafts, us-

ually with disappointing results. Recently in war wound work, Gillies² and others have employed the Esser method³ and modifications of this method. The essence of the Esser procedure is the burial of epidermic grafts (raw surface outward) on a form, which later is cut down upon and released thru the palpebral fissure after the graft has taken. The important point in the method is to get firm contact between the raw surface of the prepared area and the raw surface of graft. The point is a good one, but certainly there is no necessity for employing such technic in order to get firm contact, and the method is too crude and inexact.

In 1893, Maxwell⁴, in an article entitled "An Operation for the Relief of Symblepharon, or to Enlarge a Contracted Socket so that it may hold a Glass Eye," described a procedure for carrying a flap of skin from the lower eyelid thru the lid substance, and using this skin flap for a lower cul de sac. In 1903, he published a modification of his operation⁵. In 1918, Schwenk and Posey⁶ advocated the use of the Maxwell operation for restoration of the lower cul de sac, altho they said that the lid "evinces a tendency to ectropion" following it. They also recommended the use of a pedunculated flap from the forehead for restoration of the upper cul de sac. Sockets formed by such methods are far from ideal and, manifestly, outward deformities must follow their use. An oculist who recently has been resorting to the Maxwell operation writes me, "I regret to say that my personal experience with the Maxwell operation is sufficient to prove to me that it is not practical."

Morax⁷ in an admirable treatise on "Plastic Operations on the Orbital Region" treats the subject of socket restoration in an interesting way. He advocates the use of cutaneous pedicled flaps from the upper eyelid and temple for partial symblepharon and of dermo-epidermic grafts for extensive grafting. He also suggests the combination of the two for total obliteration. In using the detached grafts,

Morax employs an elaborate technic, operating in stages. First, he makes his dissection, including free canthotomy, and exposes the area to be grafted upon by attaching the upper lid margin to a raw surface just under the brow made by an incision, and by attaching the lower lid margin to a similarly made raw surface in the cheek. He then covers the raw surfaces of the eyelids and fundus of the cavity with dermo-epidermic grafts taken from the arm. About a fortnight later, he liberates the lid margins from the brow and cheek, and brings the lid margins together to adhere over a mould of lead or paraffin. Four to six weeks later, he opens the cavity and puts in an artificial eye. In combination with this method, sometimes he turns in a pedicled flap from the temporal region. In doing all this Morax has made a complex matter out of a relatively simple one, and has unnecessarily lowered his chances of getting a complete take by creating an uneven grafting surface with areas of decidedly varying degrees of resistance to pressure, and so with varying chances of good contact between raw surfaces.

The critical comments which I have made on ingenious schemes and on methods, in some ways admirable, employed by other surgeons are not offered in condemnation, but merely to give reasons for my seeking a technic which will give more nearly ideal results and which will have an appeal for general adoption for restoration of the socket.

THE AUTHOR'S TECHNIC.

Let us assume a case of complete obliteration of the eye socket.

Before grafting for restoration, the surgeon should be sure that there are no pus forming areas in the region. In war wound cases, purulent dacryocystitis and pus pockets from foreign bodies are not rare, and in such cases, excision of the diseased lacrimal sacs or other pus sacs is of importance as a preliminary step. Eyelid deformities may be present and preliminary plastic procedures may be necessary for their repair. I have in mind such injuries as partial or complete loss of hair line

at the lid margin, lid lacerations, and also deformities due to unsuccessful attempts at repair of the cul de sacs, particularly by attached flap methods. In all such cases, the lid restoration should be completed before that of the socket is undertaken.

Anesthesia.—General anesthesia is administered, preferably thru a tube, as the surgeon should not be hampered by an ether cone or any form of inhaler which would encroach on the operative field. I have restored the lower cul de sacs under novocain infiltration anesthesia, but have never attempted complete restoration with any form of local anesthesia. I believe, however, that it might be feasible to perform complete restoration under local anesthesia in some cases. The entire procedure should not require more than an hour to an hour and one-half.

Instruments, etc.—Small scalpel, mouse tooth forceps, multiple tooth forceps, anatomic forceps for sponging, straight and curved scissors, lid evertor (such as Ehrhardt's), three or four fine artery forceps, lid retractors and strabismus hooks, skin graft razors, a teasing needle, dental impression compound. A needle holder and 00 or 000 plain gut ligatures may be used in the preparation of the orbital bed.

Preparation of Patients.—Robust physical condition is desirable for a complete "take" of the graft and for prompt healing with a minimum of granulation tissue formation under the graft. Any constitutional ailment should be combatted, and the physical condition of the patient should be built up. For several days in advance, the field of operation should be kept clean by boric acid bathing and if there is any blepharitis, this should be corrected by a suitable ointment (yellow oxid 1%, or bichlorid 1-3000) and massage. If the operator chooses, the thigh area from which the graft is to be taken may be prepared in advance by shaving, rubbing with alcohol and ether or with benzene or gasoline, and applying a sterile dressing. Usually I do not give the skin area any advance preparation, and after the patient is under anesthesia, shave it shaved and thoroly rubbed with gauze soaked in alcohol and

ether, and then cleansed off with sterile salt solution. I have used tinctur of iodin on the skin, but its use is not necessary and I have abandoned it. The lids and any remains of conjunctiva should be wiped free of any secretions, and tinctur of iodin should be applied thoroly to the entire operative field.

Preparation of Bed to Receive Graft.—An incision is made to separate the lid margins if they are adherent, and then the dissection is carried in such a way as to separate the lids from the orbital contents. A free canthotomy is made extending from the outer canthus to the outer orbital margin. The idea in making such an extensive canthotomy is to enable the surgeon to introduce a large form so that the whole socket may be restored at one operation. If only the upper or the lower cul de sac has to be restored, a short canthal incision is sufficient and in some cases, none at all is needed. In lifting the eyelids from the orbital contents and making the socket which is to be lined with skin, several important points should be borne in mind.

First. *Plane of Dissection.* The dissection must be kept superficial, so that in front of the dissecting knife or scissors, there is only lid tissue—that is only skin, orbicularis and the thin fascia of the lid, and tarsus. It is not even necessary to save the tarso-orbital fascia with the lid. Probably one of the most common causes of failure is for the surgeon to carry the dissection back into the orbital tissue. The sense of touch helps out in this part of the operation. By external palpation, the scissors can be felt thru the thin lid and can be kept working accurately. After cutting the eyelids from the underlying tissues, I evert them with the Ehrhardt lid evertor and carefully trim away anything adhering to the thin layer of fascia which lines the orbicularis. This leaves a thin but well vascularized lid layer with a smooth and favorable area to receive the lining graft of epidermis.

Second. *Extent of Dissection.* Not only the superficial plane of the dissection, but the extent and limitations of the dissection are important. Temporally and below, it should be carried well

to the orbital margin and even 1 mm. or 2 mm. beyond, as we wish the graft to adhere to the periosteum of the anterior aspect of the orbital margin. On the nasal side, the dissection should be to the anterior crest of the lacrimal groove and to the orbital margin above it. A point of caution is in order here. The internal canthal ligament holds the lids at and

stroy the levator palpebrae. If the grafted skin is attached to the periosteum below and laterally, it is sufficiently anchored, and slung across from the nasal to temporal margin, as it were. It is not necessary to have a deep cul de sac above. It is important that it be deep below, so that no support for the prothesis will have to come from the lower lid. At the sides,

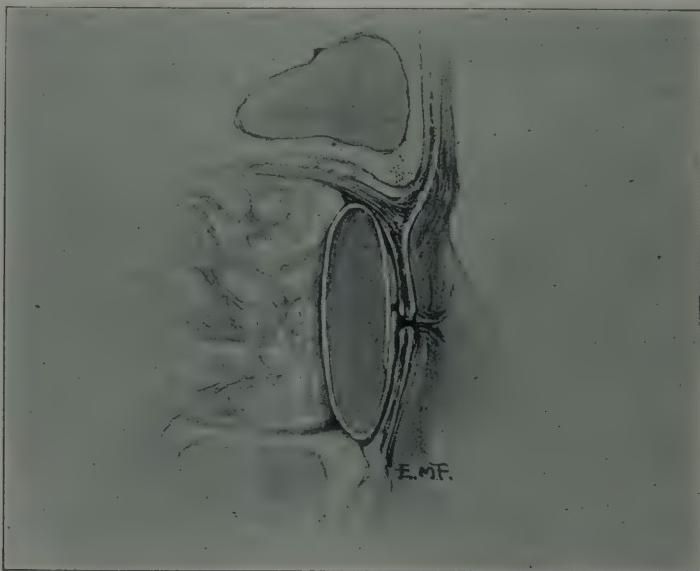


Fig. 1.—Vertical antero-posterior cross section thru the eyelids and orbital contents for a new socket.

near the canthus so unyieldingly in position that, in attempting to carry the superficial dissection behind them, there is danger of cutting thru one or both of the lids near the canthus. Both vision and palpation should be employed to avoid this accident. Should it happen, the wound can be closed by skin sutures, after the graft has been placed. A point of refinement in dissecting at the inner canthus is to save the caruncle if it has not already been destroyed. The graft will adhere to the posterior surface of the caruncle and give it a permanent lining. Temporally and below, the division of tissues is made to the orbital margin, and nasally, to the lacrimal crest; but in the division of the tissues above, the dissection is carried behind the orbital rim and not necessarily to the roof of the orbit. It is not always necessary to de-

orbit and eyelids to show dissected cavity between

the socket should extend well beyond the canthi, for if any part of the edge of the artificial eye shows, the appearance of a globe is gone, and with it the illusion.

Third. In preparing the bed for the graft, *all cicatrical and granulation tissue should be removed*. Excision of granulation tissue is especially urgent, as its contraction may result in contraction of the socket. Many sockets have suffered on account of failure in this regard. Reduction in size of the newly made socket is not due to contraction of the skin itself, but to that of underlying tissue.

Fourth. *Thinning and Trimming of Tarsus.* A common fault that manifests itself after restoration of the socket is that of too much thickness of the lid margin. If to the outside skin, orbicularis and tarsus are added the skin graft and the inevitable thin layer of connec-

tive tissue underlying the graft, the lid at the margin is bound to be too thick and it will stand out as a cosmetic blemish. This deformity can be obviated by cutting away tarsus. If the skin graft must extend completely to the margin of the eyelid, the tarsus can be split and thinned. If the graft is to extend nearly to the margin, enough tarsal plate can

The tissues should not be lacerated in any way. I avoid using a tissue forceps in carrying on the preparatory dissection—merely a knife and a sturdy thin-bladed scissors curved on the flat, and carry out the process in as clean-cut a manner as possible, giving a minimum amount of trauma in order to leave the vitality of the tissues at as high a pitch

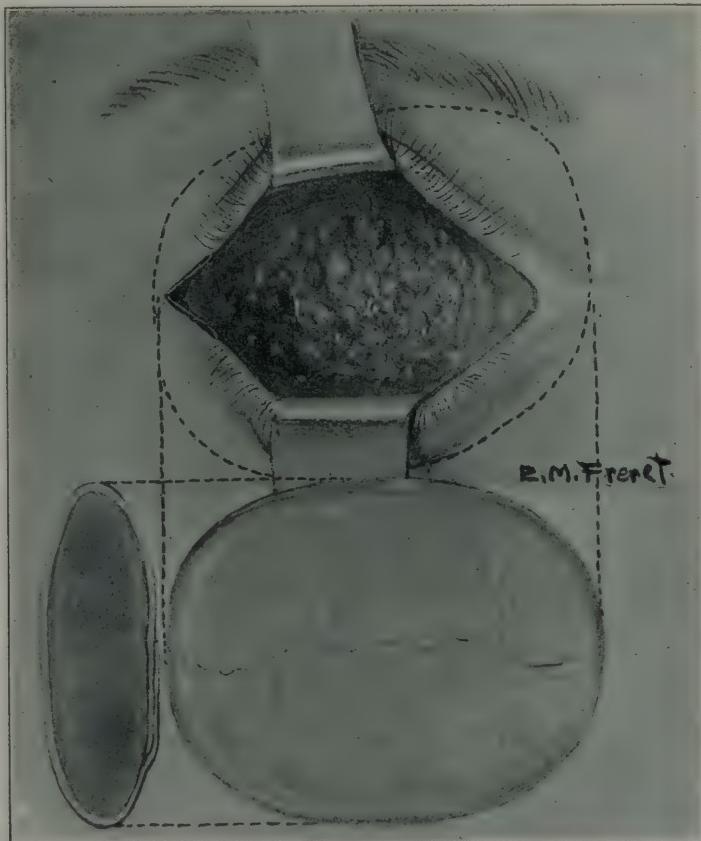


Fig. 2.—Dissection completed. Eyelids retracted to show bed for reception of graft. Orbital margin indicated by curved dotted line.

Below—Cross section and front view of form, completely covered by epidermic graft ready for introduction into the prepared cavity.

be cut away so that the graft will set in as an inlay. In any case, enough tarsus should be left to support the cilia, but not necessarily any more. For a finished result this fourth point is essential.

In all this preparation of the socket for the reception of the graft, no undue traumatism is to be offered. Spurting vessels can be caught up with fine artery clamps, but no ties should be applied.

as possible. If there is a cleft anywhere in the fundus of the socket due to the removal of scar tissue, it may be closed by the use of buried fine cat gut ligatures. On no account should suture material be exposed so as to come in contact with the graft after it has been introduced. During the dissection, there is bound to be considerable bleeding and the assistant can be of great help by skillful sponging

with gauze strips and anatomic forceps, using firm pressure in the act, but not rubbing the exposed tissues.

Removal of any tags, free or attached, and irrigation with lukewarm normal salt solution or boric acid complete the preparation. No hot solution or strong anti-septic should be used, for fear of lowering the vitality of the tissue cells. After

to 45 mm., width 30 mm., thickness 4 or 5 mm. The entire surface of the form should be smooth and free from cracks. After the moulding process is finished, drop it in cool or cold water or salt solution to "set" it. If you do not get it right in size and shape, you can put it back into the hot water again and make corrections and then "set" it again in



Fig. 3.—Vertical cross section showing epidermis-covered form placed for lining of new socket.

the cavity is ready, do not pack it. Simply put a damp pad over the lids and apply pressure if there is any oozing.

The Form to hold the Epidermic Graft. A form is now moulded to fit the cavity. Dental impression compound is ideal for the purpose. (I have found "Kerr's Perfection Impression Compound" satisfactory. It can be obtained from any dental supply house.) Sterilization of the compound can be accomplished by baking it, or by putting it in a porcelain dish and placing the dish in boiling water, there to remain for 15 or 20 minutes. The moulding process is best accomplished by holding the plastic compound in warm water and working it into the desired size and shape with the fingers. Ordinarily for full restoration of the socket, the dimensions are approximately as follows—length 40

cool water and leave on a towel or tray until the graft is ready.

Taking the Skin Graft. The ideal graft for socket restoration is one without perforations, and made up of epidermis only, free from layers of true skin, and large enough to be wrapped around the form of impression compound with generous overlapping. This means a graft 3 to $3\frac{1}{2}$ inches long and $2\frac{1}{2}$ to 3 inches wide. I am not content with patches or scraps of skin for this purpose, and I do not allow myself the liberty of cutting into the dermis, altho to do so is much easier than not. To carry true skin along with the graft means delayed healing and scarring of the area from which the skin is taken, and it means a less tractable graft for wrapping nicely about the form. It also means undesirable and unnecessary thickness of the socket lin-

ing, with decreased pliability, and, moreover, the possibility of oily secretion which becomes rancid, and hairs which have to be pulled. I say this with the knowledge that Morax and others recommend dermo-epidermic grafts for the purpose.

The razor should have a larger blade than is usual for a shaving razor. Otherwise the design is unimportant. The Dench model is satisfactory. But the cutting edge must be keen to a fault throughout its entire length. I have gotten better razor edges from barbers who would take an interest than from instrument makers. It is well to have at least two razors so that if one is found faulty, you can have another chance.

The outer aspect of the upper part of the thigh is the best place from which to get a large epidermic graft. This is shaved, cleansed and draped. Then a very little sterile vaselin is rubbed on the skin, so that the razor blade will not stick to the skin at the edges of the graft as it is being taken. An assistant, with a towel or gauze over the skin to prevent slipping, by using the edge of his hand, holds the thigh skin taut and flattens out the surface. The operator with one hand controls the skin surface, and with the other carefully shaves off the single large graft of epidermis ($2\frac{1}{2}$ to 3 inches by 3 to $3\frac{1}{2}$ inches), taking care not to perforate and not to go too deep. With the hand, the skin surface can be so controlled that it can be depressed or elevated at different points as the need may be.

The graft of epidermis is immediately wrapped about the form of impression compound, raw surface outward and overlapped on the surface which is to be anterior. If the graft has no true skin, and if there is the slightest amount of vaseline on either the skin or the impression compound, it will cling closely to the form. In placing the graft on the form, I should use only the fingers and a fine teasing needle, and not grasp it with a forceps. The form, completely covered with epidermis, is forced into the socket cavity; and it is not necessary to remove small blood clots before placing it, as they will not prevent a "take." The overlapping portion of the graft is placed forward; so that if thru manipulation

the edges are disturbed, they can be carefully replaced thru the palpebral fissure, in such a way that every part of the form will be covered. No sutures are used. Formerly I stitched together the lid margins, but found that nothing was gained by this step, so abandoned it.

Dressing and Aftercare. In placing the gauze, it is well to put strips both above and below the palpebral fissure so as to make sure by control of the pressure that the edges of the lids are not turned in. Then gauze fluff is packed on, and a gauze patch is put over this, and adhesive strips are used to make firm pressure. A *pressure* bandage is applied, and over this adhesive strips again. Very firm pressure is important, to secure accurate contact at all points and to keep the cavity absolutely obliterated. This first pressure dressing is left in place for a week. When removed, it is bound to be soaked with blood and secretions, and there is an odor from the sloughing of the overlapped skin graft. But if pressure has been sufficient, very little reaction of the tissues will manifest itself. I should not even separate the lid margins at the first dressing, but merely bathe off the lids carefully with cotton sponges damp with boric acid solution.

After the first dressing has been removed, extreme pressure is not necessary, but the dressings should be snug. They may be changed every day or every other day as comfort may dictate. Irrigation is not necessary and disturbance of the form is to be avoided. This is to be left alone for three weeks or approximately that, and then it should be removed and not inserted again. The operator may choose to give the patient a whiff of gas for the removal of the form, as the tissues are rather tender by the end of a 3 weeks period. Usually I employ cocaine instillation for anesthesia. The form can be caught by a hook and usually can be carried out of the new socket without breaking. After taking out the form the socket is cleansed with boric acid solution and anointed with vaselin. It may be kept packed with plain or iodoform gauze for a few days. There is no objection to leaving the new skin-lined socket empty for an indefinite period. A mistaken idea is

that the socket will be lost if an artificial eye or some form of dilator is not promptly introduced. I like to wait a week or more before putting in the prosthesis, and it is permissible to wait any length of time. The cavity should be completely carpeted with skin. If there is a little break anywhere, a granulation may appear and have to be snipped off. After a few weeks, a little lacrimal fistula may form and lacrimal secretion may persist in small quantity. This is rather an advantage, in keeping the artificial eye slightly moist.

Readjustment for Palpebral Fissure. Sometimes the lid margins do not grow together sufficiently following the canthotomy, and the palpebral fissure may be too long. If such is the case, the fissure should be shortened by cutting away the epithelium of both upper and lower margins for the desired amount of shortening, splitting the lids and sewing together the two posterior flaps with knots behind, and the sewing together the two anterior flaps. In this way, one can accurately graduate the shorten-

ing so that the palpebral fissure of the two sides will match in length.

Care of the denuded area on the thigh is very simple. Usually the graft has to be trimmed a little and any trimmings can be used to advantage by sticking them back on the denuded area so as to make islands from which epithelium will grow, and thus the time of the epithelialization process is shortened. Either rubber tissue or vaselin gauze makes a suitable covering for the raw surface. Dry gauze is secured over it by adhesive strips and left for about two weeks, when the dressing can be taken off and left off.

If the surgeon has been successful in carrying out this technic, he will have a permanent socket, extending well beyond the canthi and of sufficient dimensions all around. The lids will be normally thin and pliable and the thin-walled socket will not prohibit mobility of the stump and artificial eye, altho the movements of the eye will be less than following ordinary enucleation.

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MEIBOMIAN GLANDS IN CHRONIC BLEPHARO-CONJUNCTIVITIS

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Diseases of the Meibomian gland have received little systematic attention. After a brief historic introduction this paper describes and gives illustrative cases of simple hypersecretion, simple chronic inflammation, chronic Meibomitis with hypertrophy, chronic Meibomitis with chalazia, chronic conditions secondary to chronic conjunctivitis, especially trachoma, and chronic Meibomitis with concretions. This paper from the Department of Ophthalmology, University of Nebraska Medical College was read at a meeting of the Sioux Valley Eye and Ear Academy in Sioux City, January, 1921.

The affections of the Meibomian glands seems in some ways a rather trivial subject. The conditions involved are seldom very serious, and probably never by themselves cause any loss of sight. It is perhaps for this reason that the literature contains so few references to the pathologic conditions of these glands aside from those devoted to chalazia. I believe, however, that inflammation of the Meibomian glands, alone or as a complication of other diseases, is such a common source of obstinate discomfort among elderly people that a consideration of its types, with their symptoms and treatment should be worth a brief presentation.

The first mention I can find of this simple chronic Meibomitis, as it may be called, to distinguish it from that form in which chalazia occur, is that by Mackenzie in 1840.¹ He described as "Ophthalmia Tarsi" the condition in which the Meibomian secretion is increased in amount, and becomes puriform in character, the glands being distended with fluid which oozes out of them on pressure. Scarpa in 1895² appears to have described a similar condition as "The Puriform Palpebral Flux." Elschnig³ mentioned the same condition in 1901, and in 1908 gave a classical description of what he calls Conjunctivitis Meibomiana, advocating massage of the lids as the treatment par excellence. He seems to have appreciated the essential chronicity of the trouble, teaching his patients how to squeeze out their own lids, so that, even after all symptoms have disappeared, they may do this every few months to prevent recurrence. Fridenberg,⁴ the first American author to mention the condition, in 1903 described two similar cases, and mentioned the efficacy of squeezing out the lids in all cases of chronic blepharitis, super-

ficial corneal ulcers, and other conditions where retention of secretion in the glands could add to the irritation. V. Michel⁵ in 1908 discusses rather fully various disorders of the glands, acute and chronic. He calls attention especially to the changes in trachoma where the ducts become occluded, and cystic enlargement of some of the glands occurs, with atrophy of others.

In a society discussion in 1919⁶ Thompson and Neeper both mentioned expression of the lids for the relief of these chronic inflammations, the latter stating that two or three expressions often restore normal function.

Closely allied with these cases of simple inflammation or hypersecretion are those with multiple chalazia associated with more or less inflammation of all the Meibomian glands. Addario⁷ in 1888 described an extreme case of this kind with diffuse thickening of all the lids so that the eyes could not be completely opened. Fluid could be squeezed out of all the glands. A complete cure was obtained in 7 weeks by an ingenious method of expression with a modified Snellen's forceps, by which pressure could be maintained on each lid for 15 to 45 minutes at a time. Dianoux⁸ in 1891 mentions these cases as fairly common in his practice, and under the name of "Conjonctivite à Chalazion," gives in most satisfying detail their clinical picture. He states that there may be months of congestion and mild discomfort before the first chalazion appears. When this is removed, the conjunctivitis continues till the next one develops, and these continue to keep up a chronic irritation for months or years, there often being several (even as many as 14) chalazia at once. In more severe cases, all the Meibomian glands secrete a whitish liquid or puriform matter. In treat-

ment, besides curetting the larger nodules, he rubs the lids with a yellow oxid of mercury and potassium iodid ointment for five minutes, producing a reaction during which smaller nodules are often absorbed. The four cases of Natanson⁹ were of this type, one having 20 Meibomian abscesses at once. He mentions others of the simple type.

In these reports, no particular attention is given to etiology, except in that

stye, our chronic cases seem to fall into five groups, which may be briefly characterized as follows:

1. *Simple hypersecretion*: The typical case shows little or no irritation, but simply an excess of secretion from the glands. It is usually seen as a frothy white scum, collecting about the internal angle, and requiring constant wiping. This scum is the waxy Meibomian secretion emulsified in the tears. Pressure on



Fig. 1.—Extreme hypersecretion of Meibomian glands. Case 1. (Gifford).

of Dianoux, who attributes them to the socalled chalazion-bacillus. In a few cases, however, definite infection with unusual organisms has been recorded. Maklakoff¹⁰ in 1901, described an infection of 5 years' standing with multiple Meibomian abscesses, from which *B. ozenae* was cultivated, it being likewise found in the nose. It was completely relieved by the heroic treatment of splitting the lids along their whole length, and thoroly cleaning out all the affected glands by curette and cautery.

The case of Reitsch¹¹ more resembled the simple type, without palpable nodules, but small ulcers around the mouths of the glands which were all full of fluid. Friedlander's Bacillus was isolated from the secretion and from the nose. Castelain¹² from recurrent Meibomian abscesses with diffuse thickening of the lids, isolated a *Streptothrix*.

Leaving out of account the acute cases of hordeolum internum or Meibomian

the lids expresses a white waxy material; usually in semi-solid coils, but sometimes of softer consistency.

Case 1, is the most extreme example of it I have seen. Mr. G., aged 62, appeared with a mature cataract of L.E. R.E. had been removed. Both eyes showed a rim of frothy white secretion along the lid borders, and pressure on the Meibomian glands expelled from each gland a great excess of white waxy semi-solid material, which on being left in the sac assumed the same frothy appearance. (See Fig. 1.) The patient stated that this had been present for ten years or more, but that his lids had never felt irritated, and that it bothered him very little. Smears of the secretion showed a few slender Gram-positive bacilli, like *B. Xerosis*, and a few larger ones resembling hay bacilli. Cultures showed *staphylococcus albus* only. In preparation for his cataract operation, the lids were squeezed out daily for a

week, and his daughter was taught how to do this, but after a month of daily squeezing-out at home, with the use of zinc cerat ointment, the secretion remained undiminished, so the extraction was performed by Dr. Harold Gifford, and 20/30 vision obtained.

These cases are usually seen only incidentally with the occurrence of some other condition. Many old people, especially, show a greater or less degree of it, without any symptoms; so I have not noted its frequency in our cases.

2. Simple Inflammation or Simple Chronic Meibomitis: This occurs in the same type of patients as Class 1, and evidently often develops from it. Whereas in Class 1, the yellowish glands may be followed under the clear and uninflamed conjunctiva, in Class 2, the conjunctiva is reddened over the glands and becomes less transparent. Pressure on the lids forces out a whitish or yellowish cloudy fluid from some of the glands, usually not so solid as in simple hypersecretion. Often, gentle pressure expresses nothing from some distended glands since the ducts are closed up, but stronger pressure forces out large quantities of grumous fluid. The patients complain of burning or scratching, especially after reading. They often have refractive errors. Usually, however, correcting the refraction does not relieve the symptoms, as the changes, whatever their cause, persist. This is the type of case most frequently met with, and wherever an old refraction patient complains of symptoms disproportionate to his refractive error, we examine his lids carefully. One typical case will suffice to illustrate this class.

Case II, Mr. F., aged 60, complained of a burning sensation and tired feeling in his eyes for over a year. Vision was brought up to 20/20, both eyes, with a slight change in his refraction, and bifocals were prescribed. The lids of both eyes were thickened and inflamed along the ciliary margin, and the conjunctiva reddened over the glands. A large amount of semitransparent, honey-like fluid was expressed from most of the glands. As he was obliged to return home at once, zinc cerat ointment was prescribed to be rubbed into the lid bor-

ders at night, and his doctor was instructed by letter how to squeeze out his lids twice a week. A letter two months later reports no further symptoms and that he is continuing the treatment. His smears showed a large group of Leptothrix threads with a few isolated threads. Evidently a small mass of concretion of Leptothrix threads was broken up. (As only one large mass like this was found, it is questionable just how much this organism had to do with his condition.)

3. Chronic Meibomitis with Hypertrophy: This is only a more advanced stage of Class 2, and includes those cases who have in addition to the distended glands and congestion, a strip of hypertrophied conjunctiva along the glands, roughened and raised above the level of the tarsal conjunctiva, so that the glands can not be seen beneath it. It often occludes the mouths of some glands. In a series of 18 cases of chronic Meibomitis picked up from our records of the past year, only 3 could be said to fall in this group, the rest in group 2. These three were more refractory to treatment than the simple cases, and tho they may be kept comfortable, I would expect the strip of hypertrophy to remain much the same. I have seen no mention of this particular type in the literature.

4. Chronic Meibomitis with Chalazia: This is what Dianoux called "Conjonctivite à Chalazion," and his description could hardly be improved upon. In our experience, this occurs in younger people than simple Meibomitis. Of our 18 cases in classes 2 and 3 all were over 40 but six, eight were over 50, and only one was under 30. Of six cases from the past year which fall in class 4, however, only one was over 40, the ages being, 35, 30, 54, 28, 22 and 7 months.

Case III, a man of 28, is typical of this class. He has been coming in every two or three months for the past year, each time with one or more new chalazia. His whole right lower lid has become about twice its normal thickness and honey-like fluid can be expressed from all the glands. After curetting a chalazion and thoroly squeezing out the lids, with the use of zinc cerat ointment and heat afterwards, he will remain comfortable

for about a month. Then he will stop using his ointment, and after a week or so the burning sensation will return, increasing till he comes in to have another "lump" opened. I include in this class the 7 months' baby with about thirty small chalazia in the two right lids whose case has been reported before on account of the unusual finding of a fusiform bacillus in the cheesy material expressed.

trachoma, but who shows an atrophy and incurving of both his upper tarsi which makes it almost certain that he once had it, tho nothing active is left. He has left, however, the most surprising collection of a honey-like semipuru-lent fluid in all his Meibomian glands, with occlusion of some of the ducts. About 30 to 40 minims of this fluid can be expressed at one time, and on the following day just as much will be pres-



Fig. 2.—Extreme case of chronic Meibomitis, probably following trachoma, altho without such history. Case 4. (Gifford).

5. Chronic Meibomitis secondary to various forms of chronic conjunctivitis, especially trachoma.

Almost all cases of trachoma which have reached the atrophic stage show a dense connective tissue over and between the glands, which often occludes their ducts, producing retention cysts, and greatly increasing the irritability of these old eyes. Whether or not these changes themselves increase the trichiasis or cause mechanical irritation to the cornea, it is a fact that the corneal irritation is much less when the glands are periodically squeezed out. We do this in nearly all our atrophic cases, and there is one old man whose trachoma is entirely well, who comes in about twice a year to have his lids squeezed out, and insists that they be squeezed until they hurt.

Case IV, is an extreme case of this kind, of whom I have photographs. (See Figs. 2 and 3.) He is a man of 42, who is not conscious of ever having had

ent. We have found that repeated squeezing out helps him very little, and a course of X-ray treatments had no effect whatever. Now that I have done a lip-flap operation on the worst eye for his trichiasis, he continues fairly comfortable, especially while he uses the ointment at night. Trichiasis has reduced his vision to R. 20/50 and L. 20/30, however, and his eyes are very easily irritated.

6. *Chronic Meibomitis with Concretions:* Many old people show one or more small white nodules under the tarsal conjunctiva, especially of the upper lids. There is often no inflammation seen about these, and they never cause symptoms till the conjunctiva over them becomes worn thru, so that they scratch the globe. Then their removal with the point of a Graefe knife gives complete relief. Most if not all of these concretions are deposits of lime salts in alveoli of the Meibomian glands, probably those whose connection with the main gland

has become occluded, so that lime is deposited in the inspissated secretion. The most marked cases of this condition are seen in old trachoma.

Case V. A man of 60 who had been under Dr. Harold Gifford's treatment for trachoma ten years before, came in

In an attempt to get at the etiology of these conditions, I have given some attention to the bacteriology of this pathologic Meibomian secretion, as well as that of a series of normal lids, on which I hope to report in a further communication.

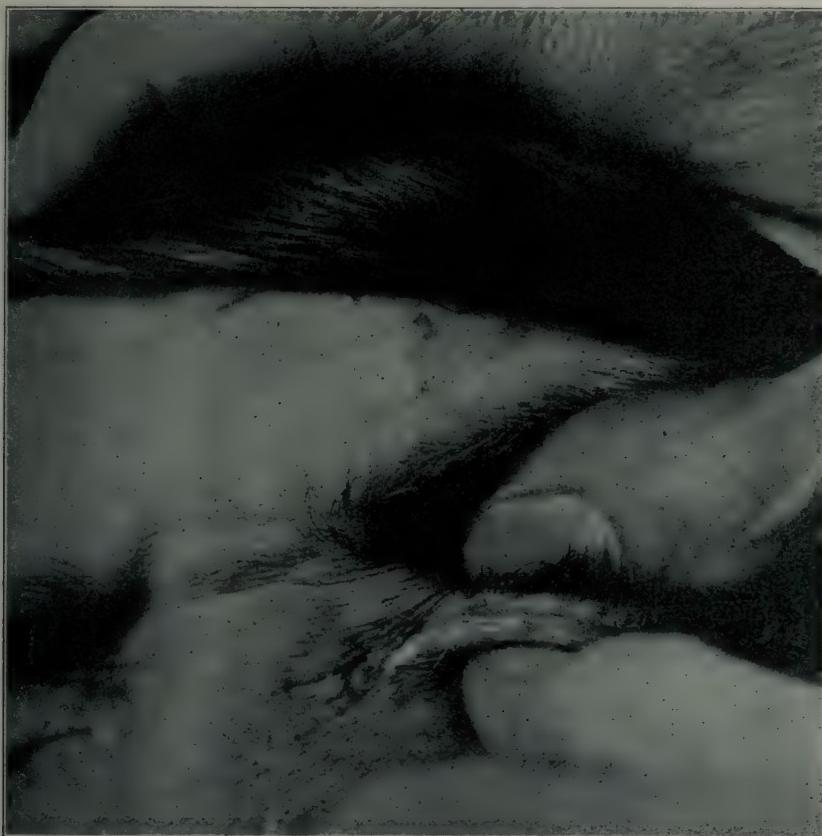


Fig. 3.—Also a picture of Case 4 to illustrate the method of squeezing out the retained contents of the Meibomian glands, which generally lessens the corneal irritation.

complaining of a scratchy feeling in both eyes. No active trachoma was present, but the conjunctiva of both upper lids appeared as a thin membrane covering large masses of lime salts, which could be seen to follow the course of the Meibomian glands irregularly. Many of these masses were exposed and grated on a knife passed over them. At two sittings, a week apart, 50 to 75 of these masses were picked and curetted out of each upper lid. The patient left for a distant city, so that he could not be further observed.

Besides the bacteriologic data obtained in this series, I consider it of great value to have observed the types of secretion in over 40 normal pairs of lids. When a case with red lids presents itself, the redness may or may not be due to Meibomitis. It is of importance to know whether the secretion squeezed out is pathologic. While the normal secretion is almost clear, especially at first, a little white waxy material is usually expressed, and I believe even rather large waxy casts of the glands are not pathologic. Softer grumous fluid, and especially yel-

low honey-like fluid is usually pathologic. Where nothing is expressed at first from some glands, and then large masses of grumous material, occlusion and retention are present.

TREATMENT: In the simple cases, squeezing out the lids between the two thumb-nails, has been the most important therapeutic agent. In mild cases, a few expressions will effect a cure, especially if applied early. In many cases of well-established inflammation, however, this is of use only as it affords relief from symptoms for a variable time, as the infection, or other causative factor, can not be eliminated. Correcting the refraction is, of course, often of great benefit to symptoms. We have found an ointment of much value to keep the lids soft, and the mouths of the glands open, and of the ointments, we have most used Chesebrough's zinc cerat, a preparation

of zinc oxid in a stiff waxy base, which adheres well to the lids. This is best applied after a hot application at night.

For squeezing out, we have found no forceps as efficacious as the two thumbnails pressed together. The two lids are held together, the nails pressing on the skin of both lids at once, not on the conjunctiva. Addario's idea of continuing pressure for a longer time with a clamp might find valuable application in some cases. Dianoux's method of giving sharp rubs with an irritating ointment to produce a reaction seems a rational procedure, but I must admit not having tried it.

While none of these agents will enable us to cure a good many obstinate cases entirely, we can relieve many or all of some of their symptoms, and keep most of the others fairly comfortable.

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RETINITIS OF CARDIOVASCULAR AND OF RENAL DISEASES.

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The form of retinitis first recognized in association with Bright's disease may arise independently of any kidney lesions. This paper endeavors to discriminate between the different lesions found in association with acute nephritis, chronic hypertension and nephritis and arteriosclerosis. Presented before the Sioux Valley Eye and Ear Academy, Sioux City, Iowa, January, 1921.

Some features of the ophthalmoscopic picture of the retinitis of cardiovascular disease and of renal disease are so uniformly found that their presence may be used as a basis for the classification of the retinitis into three fairly distinct types as follows:

1. The retinitis of acute nephritis.
2. The retinitis of chronic hypertension and nephritis.
3. The retinitis of arteriosclerosis.

To these three types must be added one other that may complicate the retinitis of chronic hypertension and nephritis, and the retinitis of arteriosclerosis, being somewhat dependent on arterial changes for its presence, that is, the retinitis of diabetes. It is quite probable that this type does not depend on diabetes alone.

Arteriosclerosis may or may not be a factor in the production of the retinitis of acute nephritis. In severe cases of acute nephritis, especially in young persons, there may not be any sclerosis of the retinal arteries. If the nephritis does not last too long all evidences of retinitis may disappear and the function of the eye be unimpaired. If the nephritis and retinitis should last for a long time, however, or if there should be a number of recurrences of the retinitis, altho of mild degree, the retinal arteries will then show signs of degeneration and sclerosis.

Nephritis may occur in a person who has a well developed general or localized arteriosclerosis with fibrosis or sclerosis of the retinal arteries. The ophthalmoscopic picture, then, is composed of features characteristic of arteriosclerosis and of acute or chronic nephritis as well. This is the form most commonly found in cardio-vascular-renal diseases of middle aged and old persons, the albuminuric retinitis that is of such grave signif-

icance. It may follow arteriosclerosis from any cause, and is usually accompanied by high diastolic blood pressure and increased blood urea with decreased functional activity of the kidney. In young persons it may result from repeated attacks of nephritis of mild severity, or a single attack of nephritis in persons whose arteries have become prematurely sclerosed.

The retinitis of arteriosclerosis was described by Moore, in 1916, as a condition separate from the retinitis of nephritis, and my own observations prove conclusively to my mind that there is a distinction. However, the retinitis of arteriosclerosis comes rather late in the course of the disease, and the afflictions of other organs, particularly of the kidneys as a result of sclerosis of their vessels, often produce retinal changes also, so that the ophthalmoscopic picture is made up of features characteristic of the two diseases, arteriosclerosis and nephritis. If the sclerosis of the retinal arteries is pronounced, the characteristic points of distinction between the sclerosis of involution processes, such as atheroma, and the sclerosis of chronic hypertension may be seen, even tho signs of renal impairment are also present to complicate the picture. This distinction between the sclerosis of hypertension and other forms was not made by Moore, but I believe that it is as definitely marked and as easily recognized as the distinction between the retinitis of arteriosclerosis and the retinitis of nephritis.

For the purpose of the clinician finding this difference is very significant, and not finding it deprives him of the privilege of actually seeing what is going on in the body. Arteriosclerosis of the retinal arteries from any cause may lead to arteriosclerotic retinitis. Atherosclerosis most frequently produces retinitis,

thru localized lesions in the artery wall and resultant localized areas of retinal ischemia and degeneration. It may exist alone without renal disturbance to complicate the vascular system. But the uniform sclerosis of hypertension may produce the same picture when renal impairment is long deferred, or well compensated, and no renal break occurs.

If to the retinal arteriosclerosis of either of these types are added the hemorrhages and exudate with sugar in the urine, the picture of the retinitis of diabetes is presented.

It may be said, then, that the most prominent factor in the production of retinitis of diseases of the vascular system and of nephritis is sclerosis of the retinal arteries, to which are added other features characteristic of the etiologic factor of the sclerosis, and a careful analysis of the ophthalmoscopic picture presented may indicate the type of constitutional disorder back of it all, and give important information with regard to its severity and course.

The chief reason for the early differentiation of the retinal changes lies in the possibility of averting serious damage to the kidneys by continued high diastolic blood pressure, which produces arterial thickenings. It has been shown that long continued hypertension produces degeneration of the middle coats of the arteries, that in turn contributes to diseases of the kidneys, brain, and other organs. It has been estimated that 40 per cent of persons with high blood pressure have changes of the retinal arteries that can be discerned with the ophthalmoscope, many of them in the early stage of degeneration; and furthermore, that with proper treatment and dietary control the increased blood pressure may be brought down to within limits of safety before organic changes are produced.

The sclerosis of the retinal vessels varies in appearance as the factors producing the sclerosis differ. The sclerosis of involutional degeneration is not the same as that of the degeneration that follows hyperpiesia, and both forms may differ from the sclerosis brought about by the perivasculitis of syphilis, lead poisoning, and other chronic intoxication. The ophthalmoscopic picture is not al-

ways clear and opinions of various observers may differ in cases not well marked, but a sufficient number of them may be differentiated to make the attempt well worth while because of the aid given the clinician in his attempt to determine a patient's condition.

When arteriosclerosis and nephritis occur concurrently, or consecutively, the picture presented by the retina is complicated; but a careful analysis of the retinal changes will allow of deductions with regard to which disease is responsible for the most active changes or will indicate the order of occurrences of the changes. When one disease follows another, as for instance, diabetes following arteriosclerosis, the earlier may be so masked by general symptoms and signs of the latter that it is not detected by general examination. Its effect on the fundus, however, may be traced definitely in most instances.

Arteriosclerosis plays a prominent part in the production of the retinitis of nephritis and of diabetes, besides producing in itself a characteristic retinitis. The arteries of the retina are affected in a manner similar to the arteries of the rest of the body. It is well known that atherosclerosis, the involutional type of arterial degeneration of the cerebral vessels, is frequently accompanied by sclerosis of the retinal vessels. The reversal of this is probably always true. A marked atherosclerosis of the cerebral and retinal vessels may be present with very little change in the systemic arteries, and not necessarily accompanied by high blood pressure. So too, a systemic sclerosis may occur with or without high blood pressure in a person free from sclerosis of the cerebral and retinal vessels.

The retinitis of atherosclerosis, when uncomplicated is characterized by arteriovenous compression, contracted arteries whose caliber is not materially decreased, pipe-stem sheathing, arterial plaques, beading, increase in the light reflex stripe, and silver wire arteries. There are arterial injection of the nerve head, giving it a brick red color, hemorrhages in the nerve fiber layer, proliferation of new vessels, and extreme tortuosity and increase in the

number of the arterial twigs in the region of the macula. Small areas of capillaries are deprived of blood supply, giving rise to ischemia and white spots. Only very rarely is edema present.

These evidences of arteriosclerotic retinitis are not always present at all times and all stages of the process. With this ophthalmoscopic picture and low blood pressure, cerebral arteriosclerosis and an absence of systemic sclerosis would be suspected. With high blood pressure, on the other hand, the presence of systemic sclerosis also would be suspected. The sclerosis of the arteries giving rise to this picture of arteriosclerotic retinitis has its origin in atherosclerosis, or toxic endarteritis known as secondary arteriosclerosis. Most commonly, however, the atherosclerosis is acting alone and with a comparatively low blood pressure, and when increased blood pressure is added, evidences of nephritis may appear with retinal signs characteristic of a renal break. The arteriosclerosis of the atheromatous type is, as far as we know, a primary disease of the arteries and is not dependent on inflammation of any particular organ, or on toxemias. It is the most frequent type of arteriosclerosis found among the insane, and often results in apoplexy or other central nervous system disturbances.

The arteriosclerosis of hyperpiesia is brought about thru effort on the part of the arteries to compensate for the increase in blood pressure and to bring about an adjustment between the forces of the heart's action and the peripheral circulation.

Whether increased blood pressure precedes capillary fibrosis or whether the fibrosis precedes the hypertension is an unsettled question. "The relation between arterial disease and kidney disease has been much discussed, some regarding the arterial degeneration as secondary, others as primary. There are two groups of cases, one in which the arteriosclerosis is the first change, and the others in which it is the secondary to a primary affection of the kidneys" (Osler).

We may state definitely, however, that fibrosis and sclerosis of the retinal arteries do not precede hypertension, but follow it after an appreciable interval. The hyperpiesia or essential hypertension brings about fibrosis and sclerosis of the retinal arteries, either by intermittent rise of blood pressure over a long period, or by a gradual but steady increase of blood pressure over a shorter period. Under continued hypertension the retinal arteries first become elongated and tortuous, the reflex stripe more prominent, and the arteries appear to be smooth and round. Later, the vessel walls become thickened thru a proliferation of the intima and thickening of the middle walls. This thickening leads to subsequent contraction of the arteries, narrowing of the caliber, narrowing of the reflex stripe, arteriovenous compression, increased caliber of the veins, and hemorrhages in the nerve fiber layers and in the deeper layers of the retina. The reduction in the caliber of the vessels is more uniform than in the arteriosclerosis following atheroma. The arteries are not beaded and there is little or no tendency to formation of perivascular sheaths, or to proliferation of new vessels. Quite frequently there is retinal edema. The arteriovenous compression is just as marked as in the arteriosclerotic type of retinitis, but there is not the tendency of the veins to cross under the arteries at right angles. White spots in the retina take the form of small white isolated or confluent plaques, creamy colored layers of exudate giving a rather bright luster. This type of sclerosis is associated with or followed by nephritis. It comes about in the prealbuminuric period (Mahomed), and constitutes the types of retinitis which we recognize as indicative of serious disease. Particularly is this true if, in addition to these features, there is edema over the disc margins with fresh hemorrhage and the formation of cotton-wool exudate. The retinitis of acute nephritis characterized by the intense edema of the nerve and retina, the injection of the smaller vessels, fine hemorrhages, and cloudy exudate, may be

Clinical Varieties of Retinitis

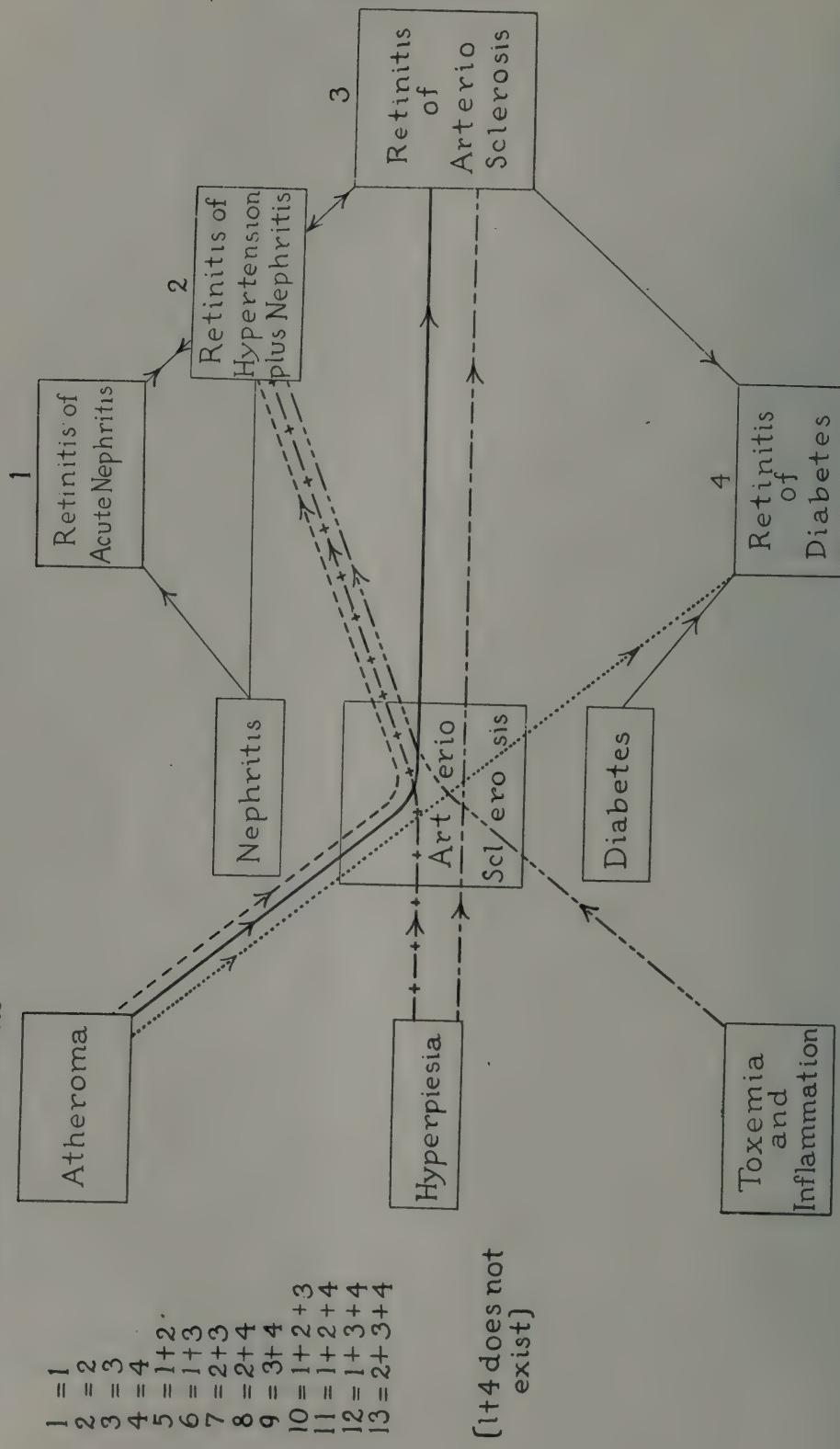


Fig. 1.—Diagram of the manner in which arterio sclerosis of the retinal arteries may be produced and the most frequent retinal condition following or accompanying such sclerosis.

added to the retinitis of "hypertension and nephritis," indicating a definite renal break with severe toxemia. Thus it will be seen that on the retinitis of arteriosclerosis which follows atherosclerosis may be superimposed retinitis of acute nephritis. It may be accompanied or followed by hypertension and nephritis, the nephritis of Bright's disease, and the ophthalmologic picture may show the changes characteristic of each.

It is possible for retinitis of nephritis and of hypertension to occur as a result of repeated attacks of nephritis without preceding hypertension, the thickening of the arteries in this case resulting from the repeated perivasculitis and chemical changes in the blood, and the temporary rise of blood pressure during the attack. Combinations of two or more of these three types are quite frequently found in the retinitis of cardiovascular-renal disease.

The retinitis of diabetes, which long

has been supposed to be due to some chemical in the blood, is quite probably due primarily to arteriosclerosis. Added to the arteriosclerotic changes are the small, round hemorrhages and retinal exudate and edema which characterize the retinitis of diabetes. Wagener and Wilder, during the past year, have studied cases of the retinitis of diabetes and have found that the characteristic picture known as diabetic retinitis occurred only in persons having arteriosclerosis. It does not occur in the grave forms of diabetes. Diabetes and nephritis may occur together, each presenting characteristic features in the retina. Not infrequently the retinal changes of one disease will be more marked in the retina than the changes of the other disease, and from the picture presented may be deduced which of the two has been active the greater length of time. (See diagram, p. 498.)

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THE OCULAR BLOOD TENSION.

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The blood pressure within the intraocular vessels has recently been the subject of numerous intelligent investigations. The results of these studies are here summarized in a way to bring out their practical applications and importance. Read before the Wills Hospital Ophthalmological Society, March 1st, 1921.

Altho some isolated vascular phenomena, such as the glaucomatous pulse, have long been observed, the systematic study of the ocular blood tension has only been undertaken within the last few years.

Von Schütten (1884) raised the ocular tension by introducing an injection needle connected with a manometer, in the vitreous of albinotic rabbits. He notes the appearance of the retinal and choroidal pulsations and concludes the diastolic blood pressure to be from 90-100 mm, and the systolic from 110-120 mm.

Bailliart (1909), and Melville Black (1911) noticed that the required pressure of the finger on the globe, necessary to produce a retinal pulsation, was much greater in some instances than in others.

Thomson Anderson (1914) was the first to attempt to measure the vascular tension in the human eye. For that purpose he used a common Geneva lens measure, to the sharp point of which a knob had been attached. The apparatus made, thru the lid, a gradual pressure on the globe. A diastolic blood pressure of 25-30, and a systolic of 70-80 mm. were found. The fact of the apparatus being applied through the lid, greatly lessened its accuracy. Nevertheless, it enabled one to compare the results obtained in different instances. He did not continue his investigations beyond this.

Moore (1916) studied the oscillations of the needle of the Schiötz tonometer in arteriosclerosis, observing that these oscillations, which exist in normal eyes, disappear in arteriosclerosis. He stated that the vascular tension is lessened in this condition. This was not due to a lowering, but to a raising of the blood pressure, so that the weight of the instrument was no longer sufficient to flatten the artery

during the diastole, a condition necessary to the production of pulsations. As Bailliart stated it would have sufficed to increase the weight to cause the reappearance of the pulsations.

Priestley Smith (1917-1918) investigated first the physical conditions of the circulation in a set of glass tubes reproducing the essentials of the vascular system. He studied mainly the influence of the enlargement of the cross section of the frictions and of the viscosity on the tension of the liquid. Applying his results to the researches of von Schütten he lessens slightly the figures of this investigator and concludes that the arterial diastolic tension is 90 mm. and the systolic 110 mm.

To P. Bailliart belongs the honor of having given to the study of the vascular tension a more practical solution, and also of having penetrated much more deeply into the subject.

As in the preceding studies his dynamometer was based upon principles of oscillometry (which is not quite useless to remind here).

In the retinal vessels of a normal eye, no arterial pulsation is to be seen, and in only 30% of the cases is there a real venous pulse.

We see no arterial pulse on account of the fact that the arterial blood pressure, even in diastole, is notably higher than the intraocular tension, consequently the vessels remain constantly full and tense.

If, from any cause, the intraocular tension is increased to the point where it equals the retinal diastolic blood pressure, the artery will empty and flatten during each diastole, and fill during each systole—thus producing a pulsation.

If the intraocular tension be further increased, it will eventually equal that of the systolic blood pressure and at

this point the artery will be completely and permanently emptied, so long as this increased intraocular tension may last.

This condition of affairs is seen in glaucoma, and is the principle upon which the dynamometer of Bailliart is based.

This instrument, with which we are enabled to take the retinal arterial and venous blood pressure consists essentially of a piston, the extension of which is applied to the sclera near the outer canthus, enabling one to produce a progressive increase of the tension of the eye. The instrument is graduated in grams so that its accuracy may be tested previous to its use with an ordinary balance.

As an example, suppose one perceives retinal arterial pulsation when the reading on the scale of the dynamometer is 20, this, added to the tonometric findings, and the result compared with a table prepared by Bailliart, will give the retinal diastolic blood pressure, in mm. of mercury.

According to experiments conducted with this apparatus the normal diastolic blood pressure in the central retinal artery is 30 mm. of Hg, and systolic is 70-80 mm. of Hg. He will study later the modifications of these pressures in pathologic conditions.

The study of the choroidal pressure is also of interest. Those of us who use the tonometer have no doubt observed the oscillations of the needle, generally considered as evidence of correct application of this instrument to the cornea. These oscillations are produced by the pulsations of intraocular vessels and since the choroid contains 80% of the arteries of the globe, these oscillations may be considered as being produced by the choroidal circulation.

Applying to these oscillations the principles stated above for the determination of the retinal pulse, we know that the oscillations of the needle have reached their maximum when the intraocular tension added to the weight of the tonometer equalizes the choroidal diastolic blood pressure, and that the oscillations disappear when those

two elements have reached the systolic pressure.

Hence it is a means of measuring the total arterial pressure of the eye and practically, that of the choroid.

Bailliart has so modified the Schiötz tonometer that successive weights may be added and a graphic curve of the pulse may be obtained by means of photographic registration.

In these experiments, account must, of course, be taken of the ocular tension. In a recent article (1920) of G. Leplat the results of investigations of the tension in the blood vessels of the iris are recorded.

In a dog, the large terminal vessels of the long ciliary arteries are very well seen even by the naked eye. Increasing intraocular tension by pressure of the dynamometer produces pulsation in the vessels of the iris, which reaches its maximum when the intraocular tension equals the diastolic pressure, this pulsation disappearing as soon as the intraocular tension reaches the level of the systolic pressure.

The diastolic pressure is 50-65, the systolic 80-90 mm. A comparatively lower pressure in the human iris must, of course, be expected, on account of the greater distance between the carotid and the eye, and also on account of the erect position of the human body. The action of various drugs on the blood tension of the iris has been studied by Leplat. Atropin increases this pressure very sensibly without modifying the ocular tension at all.

With cocaine the blood pressure is also increased, but not so much as with atropin. The ocular tension is slightly elevated. Eserin and pilocarpin produce a vasoconstriction, but do not modify the blood tension.

Dionin does not give any result.

Adrenalin produces a strong rise of blood tension; 80 mm. diastolic—130 mm. systolic.

The measure of the ocular blood tension has a physiologic and also a pathologic interest. The dependent upon the general blood pressure, the vessels of the different sections of

the body have some independence, being provided with muscular coats, under the influence of the two sympathetic systems.

As we shall see, the eye is no exception to this rule. As shown by Bailliart, in many cases of primary glaucoma, the retinal blood tension ascends and descends parallel with the ocular tension, and this without any modification of the general blood tension as shown, for instance, in the following cases:

To=Ocular tension. Ta=blood tension in the central artery of the retina.

Primary glaucoma.

January 10. R. To=45 mm. Ta=45-80 mm.

L. To=45 mm. Ta=45-80 mm.

January 12. L. To=35 mm. Ta=36-72 mm.

January 14. R. To=45 mm. Ta=45-80 mm.

L. To=45 mm. Ta=45-80 mm.

The following case of glaucoma, secondary to iritis, in one eye, is still more striking.

R. To=20. Ta=25-55 mm.

L. To=75. Ta=36-65 mm.

In a case of optic atrophy, consecutive to a considerable hemorrhage, reported by Magitot, the central artery of the retina had recovered its normal pressure much sooner than the humerals.

Let us now determine some pathologic facts. As we have just seen, in many cases of primary or secondary glaucoma, the retinal blood pressure increases with the ocular tension. The same is true in several cases of traumatic glaucoma published by Bailliart, in which the arterial tension rose with the ocular tension, and only in the injured eye.

In the albuminuric retinitis, the diastolic retinal tension is always greatly increased, and very early, so that Bailliart states that a retinitis without retinal blood hypertension is not of the albuminuric type.

Again, according to that author, in the syndrome known for a long time,

which consists of sudden and momentary loss of vision and which has been attributed to spasms of the central artery, the retinal tension is considerably increased and the spasms are produced by this increase of tension.

Magitot, in a case of posthemorrhagic atrophy, has found a retinal diastolic tension less than 15 mm. in the central artery. The tension being, of course, still lower in the capillaries, he suggests that these atrophies might be due to an atrophy by anemia of the ganglion cells of the retina and advises that the patient be kept in a horizontal position, and even in the Trendelenburg position, in order to raise the retinal blood tension.

Duverger and Barré, using the dynamometer of Bailliart, have found an average tension: diastolic 50-60 mm. systolic 100 mm. for the central artery of the retina.

Furthermore, they state that the ocular and the blood tension are independent of each other, and that the retinal tension is equal to the humeral tension, less the difference of level between the eye and the humeral artery.

Velter found a diastolic tension 35 and a systolic of 65, and emphasizes the close interdependence of general and retinal blood pressure. It should be noted that the researches of Duverger and Barré were made with the indirect method which might give less accuracy in the perception of the first arterial pulsation.

In short, whatever the imperfections and the value of all these methods may be, the relativity of which is emphasized by these authors, they constitute the first steps in a new line of experimentation which is full of promise.

[The writer wishes to thank Dr. W. Zentmayer for the valuable aid in helping him to present this article in a form more acceptable to the English reader.]

SPASM OF THE CENTRAL RETINAL ARTERY.

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With the review of previously reported cases is here given the account of a new case studied in the Clinic of Dr. H. W. Wootton at the Manhattan Eye, Ear and Throat Hospital.

Spasm or cramp of the arteries of the retina, of transient duration, has long been known, but only a fortunate few have observed this rare and interesting phenomenon. The actual physiologic process which takes place is a spastic contraction of the smooth muscle fibers in the middle coat of an artery, with resultant temporary obstruction to the blood supply. That such a spasm of the retinal arteries may occur, of sufficient degree to cause a temporary partial or complete obstruction to the flow of blood, seems proven without a doubt. (Greenwood.)

In the cases hitherto reported the extent of the involvement has varied from spasm of an individual small branch of the retinal circulatory system to involvement of the central artery. Spasm of the arteria centralis nervi optici occurred in Jamieson's patient, a man aged 84, the artery fading into a mere white line, this being followed by fading of the vein and its branches. Cases reported by Quaglino, Siegrist and von Graefe showed the larger arterial branches involved, while Pari-sotti describes the condition in a patient where the process was limited to the arteries of the upper half of the retina. In Crisp's case the upper temporal artery was involved while several observers have seen the phenomenon occur in the inferior temporal artery. Harbridge reports two cases where the inferior temporal artery was involved, the second case showing interruption of the blood current just after the artery left the disc. This interruption passed toward the periphery of the fundus while a similar process in the veins passed from the periphery toward the disc.

As regards the etiology of this condition, Langdon has stated that cases of spasmodic closure of the retinal arteries can be divided into two classes: (1) where the first attack occurred at or after middle life and there was evi-

dence of cardio-renal disease; (2) a few cases in early life without any other symptoms of cardiovascular disease. De Schweinitz and others seem agreed that certain vasomotor phenomena are responsible for many instances of ischemia of the retinal vessels, some being due to physiologic and others to pathologic reflexes. The same author draws attention to Priestley Smith's assertion that a similar clinical picture can be produced by vasomotor spasm of the cortical visual centers. The exciting causes reported are many and varied. Temporary blindness with retinal ischemia due to extreme narrowing of the blood vessels has been seen in the collapse stage of cholera (Graefe), in whooping cough (Knapp), erysipelas (Ayres), Jacksonian epilepsy (deWecker), hemlinthiasis (Farravelli), in Raynaud's disease and intermittent fever (Schnabel), malaria (Ramorino), migraine (Siegrist and others), in poisoning from quinin, salicylic acid, lead, antifebrin (Hilbert), and potassium bromid (Rubel), in arteriosclerosis (Wagenman), in hematoma of the frontal region (Van de Graaf), and even after the repeated use of an icebag (Zehender). In a number of cases the authors have stated the etiology as unknown (Alexander, Beard, et al.). H. D. Bruns reported a case in a young neurotic girl with "a nervous system faulty from the first thru inheritance, unable to regulate nicely the blood supply to every portion of the body, and that, in the imperfection of excretion by means of the kidneys and the menstrual flow we see merely the closure of a vicious circle." Von Graefe considered the probable cause of blindness in his case an insufficient supply of blood to the retina, the faint and rapid heart contractions not being enough to overcome even the normal intraocular tension. Correctness of this view is strengthened by the fact that after all other remedies failed an iridec-

tomy restored the sight. A number of cases of sudden complete blindness have been observed in perfectly healthy, normal individuals, mostly young (Beard). In spite of all the evidence at hand Parsons states that records of spasm of retinal vessels observed ophthalmoscopically are always to be received with caution, as the condition is easily counterfeited when vessels are badly filled from any cause.

Spastic ischemia is as a rule monolateral, altho Noyes reports two cases where both eyes were affected. The onset is sudden and the recovery with restoration of the circulation may occur just as suddenly, or the refilling of the vessels may be gradual (Van de Graaf). The length of time until vision is restored has varied from one to fifteen minutes or more. In Crisp's patient the interruption in the blood stream showed no change during three days in which she was carefully observed and after the second week circulation was only partially restored. The amount of visual defect varies from loss of vision in a small portion of the field to retention of light perception only, depending on the site of the lesion and number of arterial branches involved. The typical picture shows extremely attenuated arteries altho Crisp states that in his patient the empty part of the vessel appeared always of normal width. In Ramorino's case the veins were also markedly contracted, in von Graefe's they were tortuous and dilated, while in the one reported by Farravelli they were congested and pulsating. The optic disc becomes perfectly white and pale and the retina pale. As the attack subsides the veins are the first to resume their normal caliber, then the pallor of the disc and retina disappears, and vision returns. The arteries may be some time in resuming their normal appearance.

CASE REPORTED

A man, aged 34, marine insurance agent, appeared at the hospital August 29th complaining of sudden loss of vision in the left eye, the morning of the same day, with just as sudden return

of vision a few minutes later. During the day he had had several similar attacks. Had always had excellent vision and denied any previous ocular disease. Gave a personal history of measles in childhood and malaria in South Africa in 1901. The malaria had been apparently cured at this time as he had never had a recurrence. During the war he served as an officer in the British army and in 1915 had a severe attack of pneumonia. Denied luetic infection but had gonorrhea ten years ago. Is married but has no children. There is no history of ocular disease in the family but several relatives died of nephritis. Is as a rule in excellent health but has a tendency to be constipated and smokes to excess. Recently however, he has suffered from slight frontal headaches, usually coming on in the morning. Sometimes would awake with dull pains in his head, at times accompanied by dazzling sensations in the eyes. But he has had no headache, dizziness or nausea since the onset of the present illness.

Physical examination shows a well built and well nourished male. Skin of good color, no visible signs of arteriosclerosis, mouth clean, teeth in good condition, tonsils small and not diseased. Lungs clear, heart rate regular and rhythmic, sounds of good quality with a soft blowing, systolic murmur at the apex. Pulse is 72 and did not vary during the attacks of blindness. Blood pressure: systolic 146, diastolic 96. Laboratory examinations showed a negative Wassermann; urine of specific gravity 1.032, moderate excess of indican, urea 2.6%, no albumin, sugar or casts. Blood count: W.B.C. 6,100; polymorphonuclears 60%, small lymphocytes 36%, large lymphocytes 4%; R.B.C. 4,300,000, hemoglobin 75%. X-ray examinations showed no disease of the accessory sinuses but disclosed a small alveolar abscess at the root of the first molar, upper left. This tooth was extracted the next day.

Ophthalmic examination showed vision of 6/6 in each eye. Externally nothing pathologic in either eye. The pupils were two millimeters in width,

equal, and reacted promptly to light and accommodation. Examination of the eyegrounds in the intervals between attacks showed discs of normal color, distinct margins and no variations in level. The vessels were of normal size without tortuosity while the maculae and periphery exhibited no signs of disease. There was a normal venous pulsation present in the large veins on the papilla in each eye. Under homatropin the refraction was one diopter of hyperopia in each eye. The fields for form and colors were normal.

During the attacks the vision, in a few seconds, diminished to hand movements only, and the fundus of the left eye showed the following striking picture: the nerve and retina decidedly paler than in the right eye; the arteries are all markedly contracted appearing as mere threads; the veins show entire cessation of blood flow, the regular venous pulse ceasing entirely; the blood in the veins assumes a granular appearance due to the breaking up of the normal blood column; in from one to three minutes the flow of blood in the veins recommences, at first slowly, then more rapidly, the venous pulse reappears, the arteries assume their normal caliber and appearance and vision rapidly returns to normal. During the time of the attack no red spot was seen at the macula.

September 1st, four days after the onset, the attacks had increased in number to ten a day, but the patient was of the opinion that the individual attacks were not as prolonged or intense. By September 4th the number of daily attacks had decreased to two a day, both very brief. Next seen on September 7th when he stated that all attacks had ceased since the night of the 5th. On the 4th eserin had been instilled at the clinic and prescribed for home use. When seen on the 7th the tension in the left eye, by manual palpation, was distinctly less than in the right eye. By the 12th the tension in the left eye had again risen and was now normal and equal to that in the right. When seen for the first time sodium bromid, nitroglycerin, cathartics, and a meat free diet were prescribed and the patient was told to re-

duce his daily allowance of tobacco. The bromides were replaced the second week by iodid of potash. After September 12th the patient was not seen again for two months, when in response to a letter of inquiry, he came to the hospital and stated that he had had no recurrence of his trouble and was in excellent health. At this last date ophthalmoscopic examination revealed nothing pathologic in either fundus.

DISCUSSION.

The case reported above was observed during repeated attacks with no variation in the ophthalmoscopic findings as reported. In manner of onset, limitation to one eye, appearance of the vessels, optic nerve and retina, and in the rapid recovery and return to normal vision, it resembles many of the cases previously reported. However the complete stoppage of the flow of blood in the veins with the breaking up of the venous blood column into irregular granular appearing masses was a particularly striking phenomenon and one which has not been mentioned by previous writers.

Treatment in most cases has been largely based on the finding of some concurrent systemic disease. For the local condition nitroglycerin seems to be the favorite drug prescribed. Operative measures employed have been iridectomy and paracentesis. Von Graefe obtained a cure in his case with iridectomy which would seem to substantiate his belief that the probable cause of blindness was an insufficient supply of blood to the retina because of a general depressed circulation. The striking lowering of the tension in the writer's case after the use of eserin, with resultant improvement in the number and severity of attacks, would seem to place this case in the same category. But on the other hand the discovery of an alveolar abscess would raise the interesting question as to whether the attacks might not have been reflex manifestations of a focal infection.

The writer takes this opportunity to express his indebtedness to Dr. Wootton for the privilege of reporting this case from the latter's clinic.

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SOME CLINICAL PHASES OF OCULAR INVOLVEMENT IN SINUS DISEASE.

EDGAR S. THOMSON, M.D., NEW YORK CITY.

This subject is reviewed especially with reference to purulent sinusitis, eye lesions in which sinus disease cannot be demonstrated and functional disturbances of the optic nerve. It is illustrated by brief records of five cases. Read before the Academy of Medicine of Northern New Jersey, March 14th, 1921.

The influence on the eyes of sinus disease has received more or less attention in special literature for about twenty-five years or more. Numerous papers have been written and there is a rather decided unanimity of opinion on certain conditions but a diversity on others. As the question is to a great extent a matter of clinical judgment it may not be amiss to discuss it in the light of an individual experience.

Mackay,¹ classifies the diseases of the nasal sinuses affecting the eye in four groups:

First; Mucoceles of the sinuses;

Second; Acute or chronic sinusitis with external signs of orbital cellulitis, orbital abscess, tumor growth, edema of the eyelids or apparent dacryocystitis;

Third; Sinusitis without external signs of orbital inflammation but with ophthalmoscopic signs such as optic neuritis, neuroretinitis, retinal thrombosis or phlebitis, or without ophthalmoscopic signs but with visual disturbances such as central scotoma, visual field defects, ocular muscle paralyses or fifth nerve disturbances;

Fourth; Cases in which the association of sinus disease has been asserted but which Mackay considers questionable, such as glaucoma, iritis, uveitis, keratitis, and lens and vitreous opacities. "Another class which is very important to the ophthalmologist has been omitted, namely the unilateral headaches and asthenopic symptoms due to rarefaction of the air within the frontal sinus and anterior ethmoidal cells." [Brawley.²]

It is perfectly evident as we glance over this classification that it covers a very wide field and is orderly only in so far as it relates to the clinical picture. It seems preferable, therefore, to speak of the sinus conditions and the effects they may produce more in accordance with what we know of the pathologic conditions.

PURULENT SINUITIS.

There seems no reason to doubt the existence of a certain type of case as of sinus causation, in view of the numerous cases which have been observed and reported. A sinus toxemia, of antral, frontal, ethmoidal or sphenoidal origin is perfectly capable of causing plastic inflammation of the iris, ciliary body, choroid or optic nerve. The uveal disease in such cases is sharp and severe in its type, and if an iritis, may be accompanied by hypopyon.

General symptoms as headache, fever, anemia and leucocytosis will usually be found, and the X-rays will show an increased density in the area of the affected sinus. Rhinologic diagnosis is only difficult if the purulent collection is shut off in a completely enclosed cell, as it may be in posterior ethmoidal and sphenoidal conditions. However, repeated nasal examinations with cautious exploration will often uncover the tell-tale drops of pus.

It is usual in such cases to have a rapid improvement in the eye condition following a radical sinus operation, an improvement which is practically confirmatory of the etiology, altho the complete subsidence of the eye disease may be a matter of some days if the iris be involved and of some weeks in the case of the choroid. Cases of this type presuppose a process of some duration and in such, a diagnosis is often not a difficult matter.

Purulent disease of the ethmoids or sphenoids may attack the eye, not so much by a general toxemia as by a more localized process. Iritis, choroiditis, cyclitis, or optic neuritis may occur, and the diagnosis may present considerable difficulty. In general it may be said that in the absence of local symptoms in the nose, or of any suggestive appearances in the X-ray examination, dependence must

be placed in the absence of other causes for focal or general infection, in the teeth, blood, tonsils, or intestines, the type of the local process, and the fact that it is unilateral, as so many of these cases are apt to be.

Certain types of uveal disease are suggestive, a plastic iritis with or without hypopyon, (hypopyon is more apt to occur in a more extensive sinus process with general toxemia) a simple cyclitis with marked plastic deposits; choroiditis with marked plastic exudations in the choroid and retina or in the vitreous, or an optic neuritis with marked inflammatory exudates. In this connection it is well to lay stress upon the difference between an optic neuritis with one or two diopters of swelling and marked plastic exudates and perhaps hemorrhages, and a choked disc with swelling of three or more diopters with slight inflammatory signs in proportion. If seen at the outset, the differential diagnosis should not be difficult. It is certainly very doubtful that sinus disease can produce a choked disc unless accompanied by cerebral complications which give rise to increased intracranial pressure.

A unilateral inflammation, iritis, cyclitis, choroiditis, or neuritis, is very suggestive of a local causation. This is particularly the case if the inflammation is of marked degree in one eye, and of some days' duration, while the other eye remains normal. If the causative agent be a general toxemia there seems on the face of it no reason why a susceptible tissue should be affected in one eye and not in the other. Clinical experience certainly bears this out; and it is unusual to find an iritis, for example, due to general toxemia in which both eyes are not affected altho one may be somewhat in advance of the other in point of time. These facts are well known but seem to be somewhat too frequently lost sight of, and have an important bearing in the diagnosis of sinus disease.

EYE LESIONS IN WHICH SINUS DISEASE CANNOT BE DEMONSTRATED.

There are two especial varieties of eye disease belonging to this class: *First*; Choroiditis, *Second*; Functional disturbances of the optic nerve.

Choroiditis is manifested by numerous fine "dusty" opacities all thru the vitreous. An indistinct view of the fundus can usually be obtained, but no choroidal exudates can be seen. It is very unlikely that any of these opacities are derived from the ciliary body as such cases do not primarily show changes in the intraocular tension and the ciliary anastomosis is not engorged. In fact, the vitreous opacities are the beginning and end of the clinical picture, and even after the process clears up, no atrophic spots can be found in the choroid. The vision is often surprisingly good but the patient complains of seeing numerous floating spots or "clouds." Flashes of light are not seen, or are very slight, certainly not so prominent a symptom as in a more extensive retinochoroiditis.

Later in the process the fellow eye may be involved thru extension of the process to the other side of the sinuses. Secondary glaucoma may supervene and is apt to be of the subacute type with rise of tension of 40 or 50 mm. (Schiötz) and without much pain or redness; in other words, a type due to posterior retention of the lymphatic fluids rather than anterior. All search for a constitutional toxin is negative and the X-rays give no suggestive findings.

Under such circumstances the ethmoids, particularly the posterior, and the sphenoid, must be well opened and good drainage established. To the rhinologist it seems as if he were operating on normal tissues. No pus nor exudation is found and no evidence of sinus disease. Soon after the operation, however, the ocular condition shows signs of improvement. No more opacities in the vitreous are formed, those present begin gradually to absorb, and if increased tension be present it gradually comes down to normal. It is hardly necessary to say that complete resolution is a matter of some weeks or even months and that frequently a few fine opacities remain, but good vision should be the rule if the operation has not been too long delayed. Iridectomy is seldom required unless the process has been a long continued one with a long con-

tinued elevation of tension. It is, moreover, very disappointing in its results and if it be done primarily the tension is likely to recur until the choroidal process is checked by the sinus operation. The seat of trouble is usually the ethmoids, probably the posterior ethmoids. The exact nature of the pathologic process is at present not definitely known.

Functional disturbances of the optic nerve. The most striking and characteristic type of this class of cases manifests itself by a partial central scotoma of about 20° radius (concentric); with color blindness in the scotoma, and not the slightest appearance of optic nerve disease discoverable by the ophthalmoscope. The symptoms come on rapidly and may remain unchanged for a long period of time. The vision falls off to 20/50 or 20/70 and at times the test types show distortion. There are no general symptoms. X-ray and rhinologic examinations are negative. The condition is always one sided, and has not the same tendency to involve the fellow eye that occurs in a purulent sinusitis. After a period of slight fluctuation the vision at times becomes steadily worse and entire perception of light may be lost. Of course, total atrophy of the optic nerve follows if the trouble is not promptly relieved at this stage.

The diagnosis is easily made in the most characteristic form of the disease, and yet general tests, Wassermann, teeth, tonsils, intestines, etc., should not be omitted. If the case be seen when the vision is very far gone the diagnosis must rest on the absence of fundus signs, the absence of visual disturbances in the fellow eye and the absence of other causation.

A frequent criticism has been made that such cases are hysterical and that they are relieved by the moral effect of the operation. There is no way of absolutely disproving this assertion until the true pathologic condition can be demonstrated. A very important point is as to whether the direct pupillary reaction corresponds with the amount of vision. It is usual for such cases to show a certain fluctuation in

the vision and to this fluctuation the pupillary reaction should consistently correspond. Inconsistency is one of the most definite signs of an hysterical process. If the case be carefully studied an error in diagnosis should not often be made. It is certainly better to open the sinuses in a hysterical case than to allow a patient to acquire an optic atrophy from sinus disease in the presence of a wrong diagnosis of hysterical blindness.

As in the previous class of case, no evidence of sinus disease can be found during the operation. Some observers speak of finding the mucous membrane lining the sinuses, "dark, red and congested," but there seems to be no unanimity on this point, at least, among the rhinologists with whom I am acquainted. A free opening of the sphenoid and adjacent ethmoid cells should be made and in twenty-four to forty-eight hours the vision in the affected eye should begin to improve. Scotomas with only moderate decrease in vision may disappear entirely, while the more severe cases may show material gain, tho the final vision may not be secured for several weeks. In certain cases where perception of light is lost, the periphery of the field is first restored, the case passing thru the color scotoma phase, to finally normal vision. Where the case has gone on to atrophic changes in the optic nerve, it is usual to secure a marked improvement in vision if the operation has not been too long delayed.

As to the pathology of these cases, it seems on the face of it that the disturbance is most probably a mechanical one. Brawley⁸ says that, "In some cases the process is undoubtedly a toxæmia and the highly organized optic nerve fibres to the fovea are the first to suffer, which explains the frequency of central scotoma." It is true that the choroiditis cases mentioned above show enough exudation to suggest a toxæmia, but the optic nerve cases, particularly the last mentioned class, recover too quickly to be explained in this manner. All demonstrably toxic lesions of the optic nerve, without exception, are slow to recover and restor-

ation of vision is a matter of days or even weeks. Unquestionably the bleeding and depletion of the sinuses has a favorable influence, but it seems as if there must be some low grade inflammatory process, in the bone or periosteum which causes a fluid pressure on the nerve which subsides rapidly after the operation, allowing a speedy restoration of function.

Finally the practical question confronts us: Are we to allow a dangerous process to go on merely because we cannot invariably demonstrate it with certainty? Opening the ethmoids and sphenoid is not a dangerous operation when done with proper care, and it is certainly better in doubtful cases to operate than to risk allowing a latent trouble to continue.

CASES

A few illustrative cases may be briefly cited. 1. L. Male, 44, first presented himself June 4, 1917. The right eye was slightly congested and he had a number of precipitates on the posterior surface of the cornea and a discolored iris. The attack had lasted several weeks, without much change. R. V. = 20/30 + with + .50 cyl. ax. 90°. He had had a similar, less severe, attack one year before which had recovered very slowly. General examination elicited little of importance. X-rays of the teeth showed no signs of a toxic process. His hemoglobin was 82%. He had a moderate leucocytosis. He was somewhat pale and had a certain amount of intestinal putrefaction. Nasal examination by Dr. J. E. MacKenty showed nothing. X-ray examination of the sinuses showed no marked density changes.

He was treated with atropin and hot applications and finally, early in July, pus was found in the region of the sphenoid, by Dr. J. E. MacKenty. The ethmoids and sphenoid were opened and a radical operation performed by Dr. MacKenty, who found a purulent sinusitis of low grade.

The corneal precipitates rapidly absorbed and in ten days no traces of the ocular process could be discovered. There has been some difficulty in this

case in keeping the sinus open as the bony tissue proliferates rapidly. If the sinus drainage becomes defective, a few floating spots appear in the vitreous or a few corneal precipitates appear. Proper drainage of the sinuses is at once followed by a clearing up of the ocular symptoms. His vision is now 20/15 in each eye.

CASE 2. Mrs. S. 60, presented herself fortreatment May 7, 1920. An iridectomy for glaucoma had been done five weeks previously in the right eye and a week later in the left. Both eyes were red and inflamed, the left slightly worse. T. R. 23, L. 31 (Schiötz). R. V. = 20/40; L. V. = 20/100. The vitreous in each eye was full of fine dusty opacities, the left being worse than the right. Fields were normal. Wassermann negative, teeth negative by X-rays, general examination showed only a slight heart murmur with good compensation. X-rays showed some slight bony changes in the region of the sphenoid. Nasal examination by Dr. J. E. MacKenty showed that the left ethmoids were not well open.

She was treated with pilocarpin and dionin, and vaccines were made from a streptococcus which was found by culture taken from the ethmoids. She was also given iodid of potassium. The ocular conditions remained unchanged and on June 11th the tonometer readings were R. 25, L. 35. June 14th, Dr. MacKenty opened the ethmoids and sphenoid and found nothing. The following day the congestion of the eyeballs had markedly decreased and on June 21st, R. V. = 15/15 —; L. V. 15/20 W — .50 cyl. ax. 90°. Ton. Rt. 22, L. 25. July 13th, the vitreous opacities had gone and tension was normal, which it has remained ever since. The vision is now R. 20/15 — with — 0.25 — 0.50 cyl. ax. 75°. L. 20/20 — with — 0.50 — 1.25 cyl. ax. 75°. A few lens opacities remain. T. R. 20, L. 22.

CASE 3. C. Male, 19. While taking college examinations noticed that a spot had appeared in the left eye and that the letters appeared distorted. Two days later, Jan. 14, 1921, he presented himself for treatment. R. V. = 20/15 with

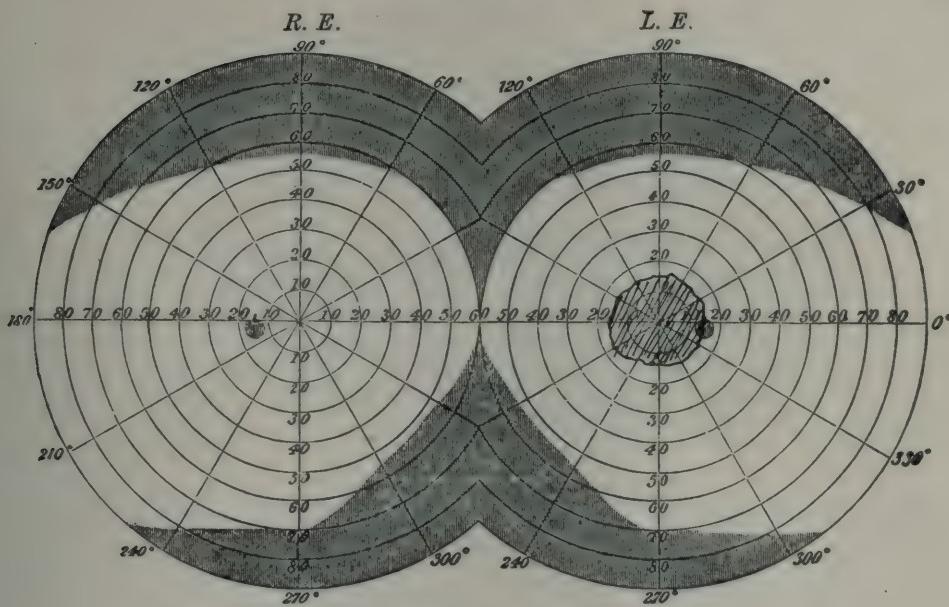


Fig. 1.—Relative central scotoma. L. E. Case 3. January 14, 1921.

+ 0.37 cy. ax. 105°. L. V. 20/40 — with + 0.50 cy. ax. 90°. There was a small partial central scotoma in the left eye with defective color perception. Green was particularly bad, altho red was also affected. The following day the sphenoid was opened by Dr. Stuart L. Craig. No evidences of

sinus disease were found. Two days later the colors were almost restored and V. = 20/15. Jan. 25th, last seen, colors normal, vision 20/15, scotoma entirely gone.

CASE 4. W. Male, 67, presented himself Jan. 20, 1921, with a color scotoma in the right eye which had been pres-

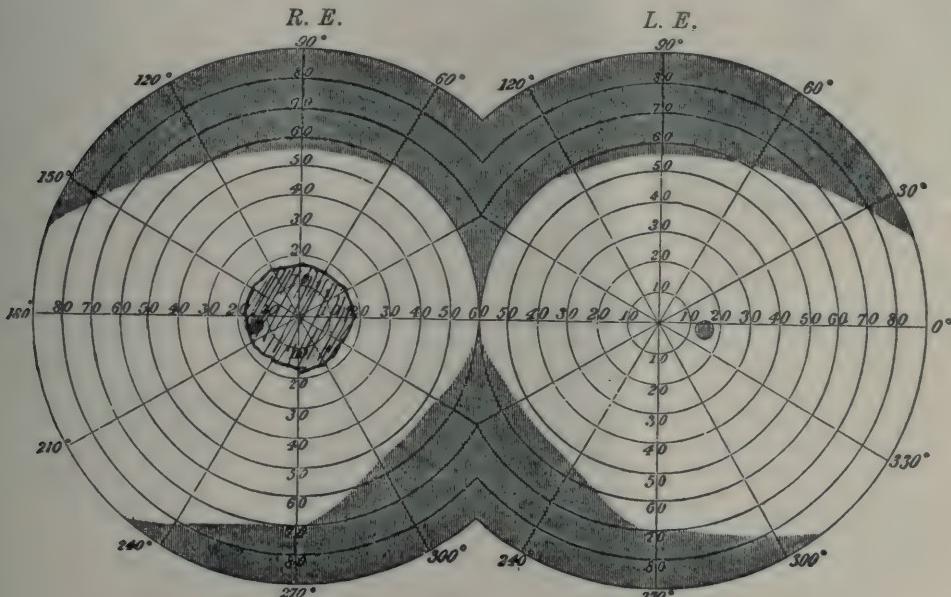


Fig. 2.—Color scotoma. R. E. Case 4. January 20, 1921.

ent two weeks. R. V. = 20/50, with his glass. L. V. = 20/15, with his glass. No ophthalmoscopic findings. General health good. Several teeth with apical abscesses. Jan. 26th, the sphenoid was opened by Dr. Mac-Kenty. No evidences of disease found. Jan. 29th, R. V. = 20/20 —. Jan. 31, R. V. = 20/15 — with his glass. Colors normal, scotoma gone.

CASE. 5. L. female, 18, presented herself Jan. 30, 1921. There was no perception of light in the left eye. R. V. 20/15. No ophthalmoscopic findings, and general examinations negative. X-rays showed perhaps slight increase

in density near the posterior ethmoids. No direct reaction of the pupil. The conditions had been discovered a few days before, but vision had undoubtedly been failing for some days. Nasal examination negative. Feb. 7, a radical ethmoid and sphenoid operation was done by Dr. S. McCullagh. Two days later L. V. = 20/200, and a central color scotoma could be demonstrated. The vision has gradually improved since then until at the last observation, Feb. 28th, vision was 20/20, colors normal, scotoma had disappeared.

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OCULAR DISEASES OF NASAL ORIGIN.

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This account deals especially with follicular conjunctivitis, phlyctenular conjunctivitis and keratitis, orbital cellulitis and inflammatory involvement of the deeper tunics of the eye. Cavernous sinus thrombosis is also referred to. Read before the Western Section of the American Laryngological, Rhinological and Otological Society, Colorado Springs, Feb. 26, 1921.

It is a pleasure to me to know that interest in the subject of this paper is one which the Laryngologists have at last awakened to. The title of this paper is an exact repetition of one prepared for this Society in 1907, and published in *OPHTHALMOLOGY* for July of that year.

I shall classify the subject as follows:

Diseases of the nose in their causative relation to (1). External ocular diseases. (2). Orbital affections, and (3). Diseases of the deeper tunics and optic nerve, as well as of the cavernous sinus.

An ordinary chronic conjunctivitis is usually caused by some morbid condition within the nose. Dr. J. Solis-Cohen tells us of such an example in his friend, the late Dr. Harrison Allen, of Philadelphia, who suffered from this annoyance. Solis-Cohen frequently told him that if he would allow him to treat his nose he would cure the conjunctivitis. After being ridiculed for such ideas for a long time, Dr. Allen permitted Dr. Solis-Cohen to treat him. The subsequent cure so charmed the patient that he took up laryngology and became an eminent practitioner of that specialty.

Chronic conjunctivitis is frequently kept up by diseased conditions of the lacrimal passages wherein lack of drainage is acting as an irritant and reinfection from the lacrimal sac constantly taking place. Furthermore diseases of the lacrimal apparatus are in the great majority of cases due to an extension of morbid conditions within the nose. Indirectly hyperplastic ethmoiditis wherein the nasal secretion in the early stages is abundant and subsequently becomes lessened in quantity, but more tenacious in consistence, is a prolific cause, because the patient gets into the habit of dislodging this discharge by violent blowing of the

nose carrying the infection into the lower opening of the lacrimal passages so that slow invasion of the lumen takes place, similar to that which occurs in the Eustachian tube and middle ear.

If you will examine the skull you will sometimes find a large ethmoid cell lying just behind the groove in which rests the lacrimal sac. Now the thin wall which divides them as well as their proximity, occasionally allows infection of the lacrimal sac to take place by this direct route. I have found a communicating passage between this cell and the lacrimal sac on more than one occasion when I have opened into the lacrimal sac from the nose to drain it for the cure of chronic dacryocystitis.

De Schweinitz² aptly remarks "altho it might seem natural that conjunctivitis should cause lacrimal disease this is by no means frequently the case. Conjunctivitis and blepharitis so often accompanying disorders follow rather than cause lacrimal affections. Donald Gunn thinks that the cause of mucocele of newborn children becoming afterward dacryocystitis depends upon a dilated duct, the dilatation being brought about during fetal life by obstruction of the lower end depending upon some developmental fault."

Jackson believes the stillicidium seen in young infants to be due to non-development of the lumen of the duct. In many instances I have found it due to a stoppage of the lower lumen from vaginal or other foreign secretion. It most frequently disappears by treatment of the nasal end of the duct.

Follicular conjunctivitis, a disease which may be confused with trachoma, is considered to be caused by malnutrition, and its management improved by tonics, good hygiene and glasses. It is a rebellious malady and occurs at the time that the adenoid tissue of the body

is at its greatest activity, as Parsons⁸ aptly phrases it "A pathologically allied condition."

Removing offending tonsils and adenoids, particularly the latter, gives aid to any tonic and hygenic treatment which may be carried out. Correcting refractive errors which lessens congestion and irritation of the conjunctival sac is an adjuvant not to be forgotten. Jersey⁴ shows by his recent reports the consequences of confusing trachoma with this simple affection. The serious aspect of this affair is that "many school children may be stigmatized as having a disease, notoriously of uncleanliness, and will be practically compelled to submit to an operation that alone could not possibly cure them if they have malignant trachoma, and while if they have not trachoma is obviously useless and certainly not without danger to the integrity of their eyes."

Phlyctenular conjunctivitis and keratitis are usually associated with mucopurulent secretion from the nose, nasal stenosis and ulcerations about the alae nasi. In no affection do I know of such prompt cure as is occasioned by the removal of the tonsils and adenoids. This disease was treated for years by tonics, fresh air and allied hygienic methods. As I have remarked in previous essays it is a disease of much less frequency in Colorado than in the damp regions to the East and South of us. There its outbursts coincide with the moist warm days of early spring.

I have detailed in a former paper cases of unilateral lacrimation, photophobia and sometimes pain promptly relieved by draining the ethmoid labyrinth, also cases of uveitis and keratitis due to sinus affections which subsided under such treatment.

The most violent forms of *orbital cellulitis* are dependent upon facial erysipelas. It occurs from scarlet fever, typhoid and influenza, but it is most frequently caused by diseases of the accessory nasal sinuses. Birch-Hirschfeld⁸ estimates the ratio as 60%. It is commonly seen in cases where pus has broken thru the thin ethmoid plate of the orbit or has eroded the floor of the frontal sinus above the eye.

I related before you last winter a case

in which pus had entered the orbit from the maxillary antrum below it. This occurred in a very young child. Last spring I showed before our County Society a case in which there was not only pus in the orbit but a paralysis of the superior oblique; the infection being due to an acute frontal sinus empyema which was relieved without scar by the Lothrop operation.

Deeper Tunics of the Eye. Concerning the involvements of the deeper tunics of the eye; occasionally we find hemorrhagic retinitis, seldom choroiditis excepting from lues, from nasal disorders.

In 1905 I made a study of the relationship of nasal disorders to vitreous opacities,⁷ collecting twenty-five cases. From this study I deduced "that the ordinary nonspecific hyalitis is a result of a cyclitis of a low grade of activity, produced not only in myopic eyes by the systemic diseases mentioned by Hill Griffith but that diseases of the middle meatus of the nose in which there is imperfect drainage are liable in some instances to be a causative factor."

It has been my observation that diseases of the optic nerve, sometimes a papillitis, more frequently a retrobulbar neuritis, are due to causes located in the posterior ethmoid cells and sphenoid cavity. I marvel at the immunity which the eye maintains to diseases of the frontal sinus, no doubt due to its more perfect drainage naturally, or by means employed by the rhinologists in shrinking the tissues about the frontal duct; the severe pain of the acute onset compelling the patient to seek relief and the location of the pain making the diagnosis easier.

While the sphenoid cavity is far back and guarded in front from common nasal affections when its protecting barriers are disturbed and it becomes diseased by the proximity of the posterior ethmoid cells, its drainage is seriously interfered with or entirely blocked. We then have a cell with a small opening and hard bony walls with pus or secretion sometimes under pressure within it; there then occurs an effort to drain in the line of least resistance and that is toward the optic foramen. If you will examine anatomically you will notice that the bone making the outer wall of the

sphenoid cavity, tho hard, is so thin that by transillumination you can readily see the outlines and movements of any small dark object held between this thin bone and the optic foramen.

It is therefore no wonder that the optic nerve suffers when infection is held in this tight walled cell, and since retrobulbar optic nerve conditions are not always visible by the ophthalmoscope even when sight has declined beyond the hope of recovery, it behooves the ophthalmologist to search promptly and persistently by methods of known worth to make an early diagnosis.

This brings us up to the use of the perimeter and perimetric methods of diagnosis. I looked forward to being able to diagnose more easily the retrobulbar conditions due to sinus affections as distinguished from other toxic causes when van der Hoeve and others claimed that the enlargement of the blind spot upon the perimeter chart was diagnostic of sphenoid disease. Unfortunately this fact has been most disappointing altho it has led to further investigations showing that central and paracentral scotomas are valuable aids. It is not within the scope of this paper to go into the perimetric diagnosis of disease but it is to warn you that many men claiming ophthalmology as a specialty not only do not possess a perimeter but are also almost totally incompetent to use it for diagnostic purposes.

Examination of the eye ground and of the optic nerve is oftentimes of little value diagnostically unless used in conjunction with other refined methods of diagnosis.

Both ophthalmologists and rhinologists have at last reached the point where when in doubt as to the cause of optic nerve disturbances, other diagnostic methods such as X-ray of teeth and sinuses, Wassermann and other examinations of the blood proving negative, they advocate operation within the ethmoid and sphenoid areas, and I want to urge you not to delay. I should rather operate too soon than to wait too long

for X-ray and blood tests to be completed, particularly if rapid loss of sight is taking place or pain and mental conditions are present, because it is astonishing how diseases in this area are prone to disturb the mentality of the individual to such an extent as in many cases to be of great value in diagnosis. I want to impress upon you the value of studying any changed attitude in the mentality of the individual.

Cavernous Sinus Thrombosis. This is liable to occur from lesions drained by the ophthalmic vein or its branches. De Schweinitz² enumerates pustules on the face, nostrils or eyelids, or from purulent affections of the accessory sinus and rhinopharynx and from erysipelas and wounds.

He quotes St. Clair Thompson as stating that next to the sphenoid diseases pyogenic affections of the ear are the most common causes. Treatment is drainage thru the sphenoid and I hope we may have some discussion of these operations. I certainly believe that where thrombosis is threatened or suspected an early exenteration of the ethmoids and breaking into the sphenoid sinus is warranted in the hopes that depletion and possibly drainage may have a favorable influence. The terrible fatality sure to follow thrombosis warrants such procedures. Attention to the primary cause is of course not to be neglected.

The following illustrative cases have been seen within the past month:

1. Mrs. L. Ulcerative keratitis, with chronic uveitis. A radical operation upon the antrum, double exenteration of the ethmoids with drainage of the sphenoids, relieved pain and inflammation almost immediately.

2. Mrs. B. Vitreous opacities in both eyes due to chronic lacunar tonsillitis. Tonsillectomy performed.

3. Mr. J. Vitreous opacities in both eyes due to chronic ethmoiditis, with much sticky secretion in nose and pharynx. Operation refused.

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TUBERCULAR INFECTION AS A CAUSE OF DELAYED HEALING IN OPERATIONS ON THE EYE.

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The influence of tuberculosis in delaying the healing of operative wounds is illustrated in cases here reported. The good effect of specific treatment in removing this unfavorable influence is also shown.

Some years ago while working in the clinic of Dr. S. D. Risley at the Wills Hospital, an Italian fruit dealer of robust constitution, who was suffering from glaucoma simplex came under our care. Dr. Risley performed the usual broad iridectomy. A few days after the operation the man presented a low grade iridocyclitis, which, under appropriate treatment largely cleared up. There still remained, however, an irritable eye. On close examination, it was discovered that his cornea was studded with small islands of gray infiltrate which resisted all treatment. Thinking that there might be a tubercular infection, a von Pirquet was made and it proved to be strongly positive. The man was placed on tuberculin treatment and in a short time the eye became quiet and no further trouble was experienced by the patient. This case was shown before the Wills Hospital Society and reported by Dr. Risley.

I wish to present two cases which are types of a number that I have seen. On September 23, 1920, S. S. H., age 30, carpenter by trade, was referred to me by Dr. R. T. Downs, of Riverside, N. J. The patient was admitted to the Polyclinic Hospital, Philadelphia, at eight P. M. and I saw him at nine P. M. The history is as follows:

On the afternoon of the above date, a chisel, which he was using flew out of his hand striking his glasses and breaking them. A piece of the glass cut entirely thru his left eye beginning 6 mm. on the cornea inside the limbus at three o'clock, thru cornea, ciliary body and sclera straight back over the site of the external rectus muscle for about 8 mm. The iris protruded and farther back a large bead of vitreous presented.

Under local anesthesia, I cut off the prolapsed iris, replaced the pillars and cut off the bead of vitreous. I attempt-

ed to stitch the sclera together, but each time I tried to put the needle in the sclera, more vitreous was squeezed out. I then made a large conjunctival flap and covered the entire wound, stitching the margins of the flap with three sutures to the conjunctiva on the nasal side; one drop of a 1% solution of atropin was instilled with one drop of a 25% solution of argyrol; a bandage was applied and constant ice compresses were ordered.

The patient remained in bed for two weeks and in the hospital for three weeks. On the third day as the conjunctival stitches had sloughed out, allowing the conjunctiva to retract, I noticed on his cornea two abrasions, which appeared to be infected, one about 2 mm. in diameter at seven o'clock just inside the limbus and one about 3 mm. in diameter at six o'clock, 3 mm. in from the limbus. They were probably made by the splinters of glass. I instilled holocain and touched them with pure trichloracetic acid.

When the conjunctiva had entirely retracted, I found the wound nicely approximated; the anterior chamber had reformed; these abrasions, however, did not heal but became more extensive and between them and from the limbus below vascularization appeared. I used iodin, iodoform, calomel and in the office later, permanganat of potash, the actual cautery and pasteurization with a Prince pasteurizer, but they persisted. I began to be fearful lest I should have a perforation. I called Dr. Luther C. Peter in consultation and we studied the case together, deciding to continue the application of iodin and pasteurization. Up to November 17, nearly two months after the original injury, there was no improvement in the ulcers, the wound and the rest of the cornea having entirely healed, but the eye was intensely red.

On close examination with a loupe, these areas had an appearance similar to those seen in tubercular ulcers of the cornea, so I made a von Pirquet which was strongly positive. Then I began the administration of Koch's old tuberculin, by the method which I presented at the Pennsylvania State Medical Society in 1919, beginning with 1/1000 mg.; almost immediately the ulcerated areas began to clear and after a period of two months the eye was nearly quiet; during this time sixteen injections were given, the last being $\frac{1}{8}$ mg.

The patient's vision at this time was right eye 20/40 and in the injured left eye 20/40? He has a refractive error which was corrected as follows: R. +0.75 \odot +1.00 cyl. ax. 80° = 20/20. L. +1.50 cyl. ax. 135° = 20/30.

CASE 2. R. E. C., 39 years old, drug salesman. Family history. The patient is one of six children, four of whom have good eyes, one brother has congenital dislocation of both lenses. The right eye became inflamed (cause unknown) and was removed at Wills Hospital. His mother had an attack of iritis, which cleared up under treatment. She died of stomach trouble. The patient has three children, one a girl with perfect vision, a girl age eleven, with congenital dislocation of both lenses, upward, behind the iris, a boy who had congenital dislocation of both lenses, upon whom several needling operations have been performed at Wills Hospital but with poor success; he is at present at Overbrook school for the blind. Previous history. The patient never had any serious illness. He says he never had eye trouble until after a slight attack of gonorrhea, at eighteen years of age, but vision was always poor. Present history. The patient came to my office, February 6, 1920, with a very sore left eye; he had been under the care of a competent oculist for some time. During the last few years he had been examined and treated for inflamed eyes by a number of prominent Philadelphia oculists.

Present condition. The patient is tall, thin and dark complexioned, much under weight, with dry hair and skin, his flesh is flabby and he appears weak and much run down.

Eye examination. O. D. Cornea clear, anterior chamber deep, iris tremulous, partial dislocation of the lens downward behind the iris, pupil irregularly round, 5 mm., does not respond to light or accommodation, ocular movements full in all directions. Vision O. D. Without glasses 6/200, with the addition of a +5.00 spherical = 20/100. Ophthalmoscopic examination. O. D. Media clear, disc small, round, slightly pale, margins well defined, vessels small, slightly tortuous, macula and periphery negative. The right eye was always the poorest eye. O. S. Shadows at 1 ft., intense blepharospasm, photophobia, lachrymation, intense congestion of bulbar and tarsal conjunctiva, more marked at the limbus below. There was a circular area on the cornea, four millimeters in diameter, just above the limbus at six o'clock, which has a ground glass appearance. With a loupe this area had the appearance of minute nests of exudate surrounded by a halo of infiltration. The anterior chamber was deep, the pupil dilated with atropin by previous oculist, the iris was tremulous, the lens was opaque and was completely dislocated into the anterior chamber below, touching the inflamed area at the limbus and the upper margin tilted back into the pupillary area.

Ophthalmoscopic examination. No view of the fundus was obtainable, tho there was a dull red reflex at the upper edge of the dislocated lens.

Wassermann examination, negative, von Pirquet was strongly positive. I put him on desiccated sheep's thyroid gr. 1. t.i.d., instilled one drop of a 1% solution of atropin, t.i.d., one drop of a 5% solution of dionin, t.i.d., hot compresses every three hours, for fifteen minutes and began the administration of Koch's old tuberculin at four day intervals, beginning 1/1000 mg. and running up to 1/60 mg. This was followed by rapid improvement in his general condition, and he said he felt like a new man; his corneal condition rapidly cleared up except at the lower limbus. I attributed this to a quiet cyclitis caused by the presence of the

lens acting as a foreign body, so I determined to remove the lens.

On April 25, I admitted him to the Polyclinic Hospital and on the 26th, under narco and cocaine anesthesia, removed the lens without difficulty, thru an upper corneal incision. The lens was very hard, almost round and yellow in color. There was very little reaction. He left the hospital in a week and I resumed the tuberculin treatment in the office, running it up to 1 mg. The eye became quiet and the patient could attend to his duties as a salesman without discomfort. There was no visual im-

provement in this eye because of the opacities of the cornea and the extreme cloudiness of the vitreous.

CONCLUSIONS: After the most painstaking care in preparation, operation and treatment, we all have cases which do not do well and have irritable eyes. Might not these conditions be due to some bacterial focal infection? I believe that in the cases just cited, tubercular infection was the cause of the delayed healing, and report these cases with the hope that it may be of interest to others.

NOTES, CASES AND INSTRUMENTS

MARGINAL VESICULAR. KERATITIS.

HARRY S. GRADLE, M.D.
CHICAGO, ILLINOIS.

An interesting case is that of a woman of forty who has been under observation for the past year and a half. About a year ago, Dr. E. Jackson saw her and was no more able to put a name to the disease than I was. Because of inability to classify, I have called it "Keratitis Marginalis Vesiculosa."

Miss W. R., June 8, 1920. Left eye. Vision poor since childhood; present trouble with left eye of 8 years duration and has been uneventful, except for a corneal ulceration about 2 years ago. There have been blisters on the right eye some six to eight weeks. Right eye. Very slight conjunctival injection in inferior nasal quadrant. Concentric to the limbus and 1 mm. therefrom is a band of opacity 2 mms. wide extending from meridian 0 to meridian 270°. Between the limbus proper and this gray band is a 1 mm. strip of clear and normal cornea, except for superficial vessels. The corneal margin of the gray band is sharply demarcated and is concentric to the limbus. The band is covered with an unbroken epithelium that is irregularly raised; and immediately under this are innumerable vessels that pass from the conjunctiva over the clear corneal area to the gray band. These vessels show no abnormality or peculiarity, beyond extensive ramification and a very abrupt change in course at the inner margin of the gray band. At meridian 330° the epithelium over the gray area is elevated into a bleb 2 x 3 mm. in size, parallel to the limbus and 1 mm. high. The covering of the bleb is pure epithelium, thru which course the large vessels of conjunctival origin. The tissue underneath the bleb is normal. On evacuating the bleb of the perfectly clear fluid that it contained, the epithelial cover sank back into place without a wrinkle. The opacity of the gray band extended about $\frac{2}{3}$ into the depths of the cornea and under the slit lamp was found to be a perfectly homogeneous

opacity of the corneal stroma, with complete obliteration of the lymph spaces. The remainder of the cornea was normal as were the other parts of the eyeball.

The left eye was pale. The entire lower $\frac{2}{3}$ of the cornea was involved in the similar gray process, that was found in the beginning stage in the right eye. The surface of the cornea was unbroken, but very uneven, bearing more resemblance to a contour map of a foot hill country than anything else. The slit lamp showed no irregularities of the corneal epithelium. Vessels were not as numerous as in the right eye, but were larger and bore deeper into the depths of the cornea with fewer anastomoses. The marginal loops of the conjunctival vessels at the limbus showed many microscopic dilatations of an aneurysmal type. The stroma of the cornea showed a more or less uniform gray opacity with complete elimination of the lymph spaces. Corneal nerves were nowhere visible. Toward the upper clear portion of the cornea, the opacity became thinner and gradually faded into clear and normal substance, without any microscopic line of demarcation. In the lower inner quadrant of the cornea, some three mm. from the limbus, and located very deep, probably in the posterior quarter, was an irregular shaped 2 mm. area of dense opacity that seemed like a calcareous deposit similar to the type seen in Axenfeld's "Calcareous Band Opacity of the Cornea." This was so covered with semiopaque corneal tissue that details could not be discerned.

Thru the clear portion of the cornea, about one-fourth of the iris could be seen. This presented no abnormality beyond several anomalously dilated crypts. As far as could be told, the remainder of the eyeball was normal.

Many infected tooth roots were found and the general condition of the mouth was bad. All the teeth were removed; but this had no influence upon either eye. General physical examination revealed no pathology.

She was given 5% dionin, the use of which seemed to cause a slight thinning

in the opacity of the left cornea. This was later combined with fibrolysin without any noticeable influence. During the past year and a half, several blebs have appeared at different times at the ends of the band in the right eye and upon their disappearance have left behind an increase in the size of the band and added irregularity of the corneal surface.

This picture is somewhat unusual, but is rather complete, the beginning stage

PRIMARY EPITHELIOMA OF THE CORNEA WITH TREATMENT.

REX DUNCAN, M.D.

LOS ANGELES, CALIFORNIA

The following case is of particular interest; first, because of the rarity of primary malignant growths of the cornea; second, because it demonstrates the feasibility of exposing the eye to

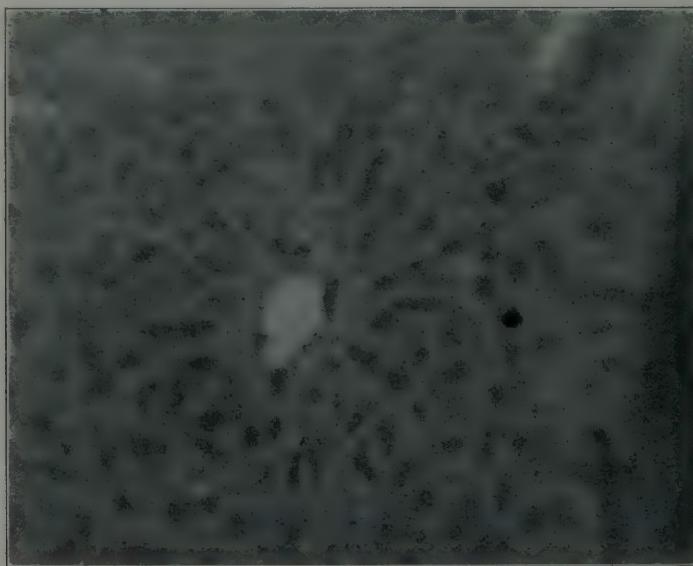


Fig. 1.—Section of corneal growth composed chiefly of epithelial cells, some arranged concentrically. Diagnosis epithelioma.

being represented in the right eye and the terminal stage in the left eye. From some unknown cause, the epithelium of the cornea, at first a short distance from the limbus, forms a bleb and subsequently, this disturbed epithelium becomes vascularized from the neighboring conjunctiva. In all probability the bleb does not rupture, but its contents are simply absorbed. The undisturbed epithelium as seen by the slit-lamp speaks against any solution of continuity. The disappearance of the bleb is followed by the uniform opacity of the underlying cornea, probably due to toxins of the vesicular contents. The process repeats and the opacity increases in size. The cause cannot be determined; but the eventual outcome is loss of vision, unless the process can be checked.

fairly large doses of radium without injurious effect; and third, because of the most excellent result obtained in this case.

W. E. K. Case No. 1094. Male, Age 60. Occupation, Stationary Engineer. Referred to me May 20, 1919 by Dr. Frank W. Miller, whose report is as follows:

"W. E. K. reported May 15, 1919, that he had noticed a small red spot in the left eye, dating back probably three months. This spot became elevated and gradually increased in size. There was no pain nor distress except mild conjunctival irritative symptoms. On examination a small pediculated and partly movable, spherical growth, 3 mm. in diameter, was found at the inner corneal limbus. This growth was thoroly re-

moved and a small funnel shaped opening was left, deep in the tissues. (See Dr. Hill's report.) Patient was immediately sent to Dr. Rex Duncan for Radium treatment. At the present time two years after treatment, there has been no recurrence. The scar is soft and small and he has a perfectly functioning eye."

Pathological examination of the tissues removed was made by Dr. R. B. Hill, whose report is as follows:

"The specimen is a small piece of tissue about the size of a split pea. Sections show it to be made up almost entirely of epithelial cells, which are fairly uniform in size and shape; they are for the most part squamous in type and take the stain deeply. Many of them show mitotic figures. In places the cells are concentrically arranged, suggesting "pearl" formation. There is a very scant connective tissue stroma (See Figure 1).

Diagnosis: Epithelioma.

Radium treatment was given as follows: Five days following the excision an applicator consisting of a tube of 100 millicuries of radium emanation, screened with 0.5 mm. of platinum; 1 mm. of pure rubber gum tubing, was applied directly over the wound and retained in position one hour. Four such applications were made, totaling 400 millicurie hours. The eye was thoroly cocainized preceding each application and the eye lids separated in such a manner as to protect them from the rays. A few days following treatment there resulted some mild inflammatory reaction, which gradually subsided during the following four weeks leaving the eye apparently normal.

This case has been seen frequently by Dr. Miller and myself and there is apparently a perfect result.

A RECORDING SCOTOMETER.

E. O. MARKS, M.D.

BRISBANE, AUSTRALIA.

The desire to combine the advantages of the Bjerrum screen and the registering perimeter has given rise to several modifications of the Bjerrum screen with which the writer is acquainted. So

far as he is aware the device now put forward has not previously been utilised. None of the instruments in use appear to be entirely automatic—either concentric circles or meridians or both requiring to be read off and marked on the chart, or noted and later plotted on the chart. Moreover the instruments all work in circles or meridians a feature which usually shows itself in the peculiar outlines of the scotomata as charted, and is a handicap in following the outline of a scotomata when under investigation.

The present instrument, which is really a recording attachment for a Bjerrum screen, has been designed to obviate these defects by providing a test object which moves freely about the field in any direction while providing a means of automatically recording on a chart the position of the test object in reference to the fixation point.

It has been constructed to a scale to suit the ordinary Bjerrum curtain, and at a working distance of one meter can record to beyond the 30 degrees circle on a chart 8 inches square. By using charts drawn to corresponding scales the same instrument could if desired be used for other working distances. It has been designed for a curtain 15 meters square, but the same device could be utilized for smaller or larger instruments.

The mechanical principle adopted is that familiar to draughtsmen in the reducing instrument known as the pantograph. It is both simple and mathematically exact in theory. Any error that occurs must be due to faulty construction or use, or to that predominant factor in any subjective examination—the patient.

The instrument consists of a suitable base from which springs a vertical standard to a height of six feet. Supported by a bracket and a round hole in the top of the standard, a rod projects horizontally six feet and has attached to it the black velveteen curtain. By pushing the rod horizontally thru the hole in the standard, or by twisting it in the manner of a roller blind the position of the curtain (and fixation object) may be adjusted to the rest of the instrument. Attached to the standard, 4 feet

from the floor and on the same side as the curtain a board holds the chart, by means of suitable slots into which the chart is slipped into position.

The moving part of the instrument is suspended on a pivot to the standard on a level with the chart. It consists of two parallelograms and a pointer. The larger parallelogram and the pointer (which is continuous with a short side

The *pointer*, if simply straight, would in some positions obscure the fixation point. To obviate this it has been given a double elbow and is capable of turning on its long axis. It is covered with the same black velveteen as the curtain and provided with a test object on each side. The test objects, white and colored, are on black velveteen covering a clip which slips on the end of the pointer.

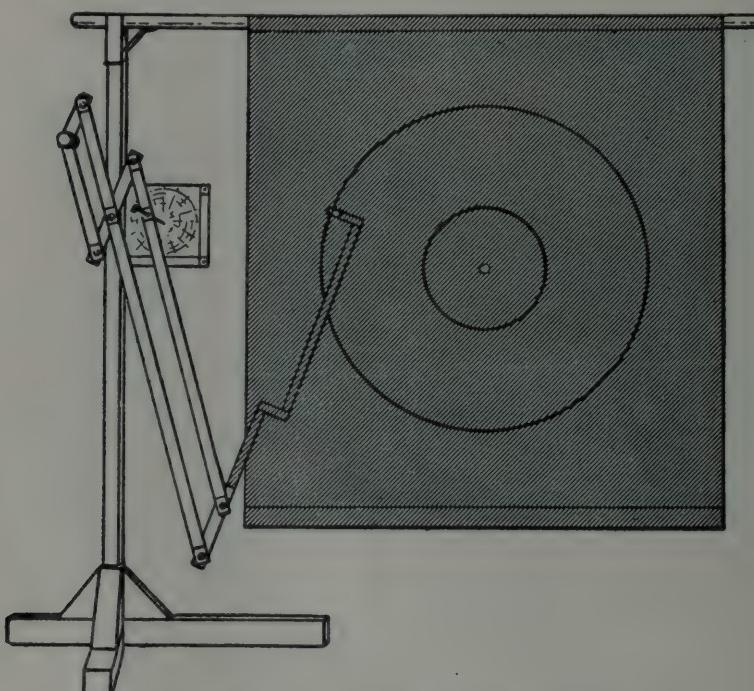


Fig. 1.—A Recording Scotometer. (Marks).

of the parallelogram) form the essential portion of the instrument, the smaller parallelogram serving merely to carry a balance weight. They are constructed of thin wooden laths, the bearings and pencil holder being of metal. The dimensions which have been adopted merely for the sake of obtaining a suitable range of movement and magnitude of chart give a reduction of 7:1 and are, between centers,
Long side of parallelogram 3 ft. 6 ins.
Short side of parallelogram 6 ins.
Pointer from test object to near bearing 3 ft.
Pencil from bearing 6 ins.

The *pencil holder* is merely a short tube thru which the pencil may be pressed against the chart whenever it is desired to record the position of the test object.

In the board supporting the chart is a small hole, corresponding to the position of the centre of the chart. This takes the wire centre of a "dummy" pencil, and serves to hold the instrument in the central position while the curtain is adjusted so that the fixation point and test object coincide.

The whole instrument might conveniently be arranged as a wall fixture and provided with electric illumination.

The chart has been printed to show (on tangent scale) the concentric circles at 5 degrees intervals up to 30 degrees and meridians at 30 degree intervals.

On the curtain the 10 degrees and 25 degrees circles have been marked in black silk, in deference to Priestley Smith's opinion of their diagnostic importance, and to act as a check on the accuracy of the instrument.

PARALYSIS OF DIVERGENCE, AND ABSENCE OF EXTERNUS

WALLACE RALSTON, M.D.

AND

EVERETT L. GOAR, M.D.

HOUSTON, TEXAS.

CASE 1. Paralysis of Divergence. H. R., age 41, detective, Sept. 15, 1920, while driving a car, suddenly noticed that distant objects appeared double. An approaching automobile, while at a distance, appeared like two cars, which, when almost upon him, merged into one. Since that time, he has had double vision, and complains of a "puckering sensation" in his forehead and about his eyes after being up one to two hours. He has been in good health, has never had any severe illness, and denies any venereal infection.

When first seen by us Jan. 10, 1921, examination revealed the following: V. R. 20/20-2. L. 20/20. Cycloplegic ref. R. 0.25 S. -0.50 cyl. ax. 90° = 20/20. L. +0.50 S. -0.50 cyl. ax. 90° = 20/20. Left pupil, 4½ mm., right 3 mm. Both react rather sluggishly to light, readily to convergence. Near point of convergence 40 mm. Ocular movements normal to excursion test. There is an esotropia of twenty degrees at six meters, with the left eye fixing and right converging. At 25 cm. there is two de-

gress of esophoria. With red glass and light, there is a homonymous diplopia amounting to twenty-four inches at twenty feet. As light is brought nearer the images approach each other, and there is binocular single vision at 19 cm. Tangent screen shows a homonymous diplopia, equal in all fields, except upper and lower, in which it is respectively less and greater. With 14 degrees prism, base out, he can fuse the lights at twenty feet. Blood Wassermann was negative. Urine normal. Blood pressure 130-80. Refused spinal puncture. We insisted upon spinal puncture and this man withdrew from our care. We are informed by a colleague that he is improving on large doses of K. I. and mercury.

CASE 2. Retraction of Globe. Absence of Externus. Mrs. C. B. B., aged 34. Chief complaint: eyes burn and hurt after close work. Right eye has been "crossed" since birth. Was one of twin babies, and states that she weighed but two and one half pounds at birth. Was not an instrumental delivery. Examination reveals: V. R. 20/50, Cor. 20/30. L. 20/30, Cor. 20/30. Accepts R.+0.50 cyl. ax 90°. L.+0.50 S.+0.37 cyl. ax. 90°. Has never been troubled with diplopia. The eyes are negative to examination, except for the following interesting muscle condition:

There is total inability to move the right eye outward past the primary position. On adduction there is marked narrowing of the palpebral fissure, with simultaneous retraction of the globe. Near point of convergence is 30 mm. Adduction is normal and there is no tendency to up or down shoot upon adduction of the eye. This case shows but three of the six signs of Duane's syndrome, but all are well marked, and sufficient to justify the diagnosis of congenital absence of the external rectus.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

WILLS HOSPITAL OPHTHALMOLOGICAL SOCIETY.

March 1, 1921.

DR. BURTON CHANCE, Chairman.

Congenital Hypertropia.

DR. WILLIAM CAMPBELL POSEY exhibited a case of congenital hypertropia in a young man with marked facial asymmetry, the left side of the face being underdeveloped. With the left eye fixed in the horizontal plane the right eye deviated strongly upward. Downward and outward motion in the right eye was abolished but the eye could be moved downward and inward to a certain extent by the superior oblique. All other movements of both eyes normal. On account of the absence of action of the inferior rectus, transplantation of muscle fibers from the internal and external recti upon the inferior rectus was decided upon. A curvilinear incision parallel to the corneal limbus was made laying bare the insertions of these three muscles. The inferior rectus was found to be absent except for a very rudimentary portion of muscle fibers found at the site of the usual insertion of this muscle into the globe. The lower halves of the externus and internus were sewed into position thru this stump. A free tenotomy of the superior rectus was done. Care was taken to bring the capsule of Tenon forward below as much as possible by double single stitch sutures. Healing was prompt. At the end of two weeks the eyes were on the same horizontal plane, left hyperphoria of ten degrees, esophoria of twenty degrees at five meters (no measurements could be made prior to operation on account of the high degree of the deviations). Refraction: R.—S. 1.00 D. \odot + C. 2.25 D. ax. 85 = 5/6. L. + S. 0.50 D. \odot + C. 0.75 D. ax. 120 = 5/5.

DISCUSSION. Dr. William Zentmayer stated that he had seen a similar case at the Polyclinic Hospital last year.

Zonular Keratitis.

DR. J. MILTON GRISCOM presented a colored woman, aged sixty, who came to the hospital three weeks ago complaining of failing vision in both eyes. The left eye had been useless for a number of years and on admission vision equalled light perception. There was a dense white band composed of somewhat irregular masses of calcareous material located just beneath the epithelium, this band being about five millimeters in width and placed horizontally across the cornea. The cornea above and below was clear but no view of the deeper media was obtained.

The patient stated that vision in the right eye began to fail following an attack of influenza two years ago. On admission there was a thin band of homogeneous infiltrate occupying a zone five millimeters wide at axis 180 degrees, in which, however, there were a number of clear spaces. Vision 20/200. No view of the media or fundus was obtained. Dr. Griscom had planned to do an iridectomy in this eye but was forced to postpone it on account of an attack of bronchitis in the patient.

DISCUSSION. Dr. P. N. K. Schwenk stated that he would be inclined to do an upward iridectomy for optical purposes.

Infantile Glaucoma.

DR. L. W. Hughes presented for DR. BURTON CHANCE a child, aged five, who was brought to the Wills Hospital clinic about two years ago with a history of having had an enlarged right eye since birth. The mother stated that at the age of three weeks the child was taken to the Episcopal Hospital in this city where a growth (described as a membrane) was taken off the eye.

Two years ago examination showed the right eye to be markedly enlarged, the external angle and temporal zygoma had an aperture like incompleteness, upper lid margins thickened and drooping, entropion of the upper lid, cornea almost twice the size of that in the fellow eye.

and presented a number of blebs, media otherwise clear and view of the fundus unobtainable. Left eye normal as far as could be determined.

At the time the patient was presented the right eye showed marked enlargement, wide palpebral fissure, lids swollen with entropion and trichiasis of the lower. The cornea very much enlarged but clear. There was a thinning of the sclera above. The anterior chamber was of normal depth, pupil somewhat irregular and did not react to light. The child counted fingers at two feet. Media were clear. There was a deep pathologic cupping of the disc which was quite pale. Blood vessels normal caliber. No discreet lesions of fundus seen except the glaucomatous cupping. Left eye normal.

DISCUSSION. Dr. Zentmayer thought the eye should be enucleated soon on account of the danger of rupture. He did not think an iridectomy was indicated.

Dr. Schwenk thought that an enucleation in the near future would tend to equalize the development of the two sides of the face.

Dr. Posey stated that he would do an iridectomy first and if this were unsuccessful he would enucleate.

Congenital Ptosis.

DR. BURTON CHANCE exhibited the following cases:

1. A case of congenital ptosis in a young negro who has, in addition to the drooping of the lids, an inability to look upward, all such efforts bring about sharp convergence of the axes, altho involuntary convergence cannot be attained until fixing object is carried upwards.

2. An instance of high myopia in a woman and her son.

3. A case showing highly glistening, numerous opacities in the vitreous, of the socalled snow-ball type. The woman came to the clinic on the day on which a man was present in whose eyes exactly similar bodies were noticed.

4. The young woman from whose left orbit an angioma was removed several years ago, which case Dr. Chance had reported before the Ophthalmological Society. The patient cannot elevate her brow nor raise her eye. Chance intends to pursue a plan of operative procedure

which shall comprise the transplanting of bundles from the frontalis.

Intraocular Blood Pressure.

DR. PIERRE GAUDISSERT read a paper reviewing the recent work of French and Belgian ophthalmologists on the above subject. (See p. 500.)

C. S. O'BRIEN,
Secretary.

SOCIÉTÉ D'OPHTALMOLOGIE DE PARIS

Feb. 19, 1921.

Pterygium Operation.

TERSON states that his operation consists essentially of resection of the pterygium followed by a rectangular conjunctival autoplasty with fixation of the sutures to the sclera as high as possible, with autokeratoplasty if necessary.

Fibroma of the Lid.

J. CHAILLOUS presented a patient with a hard circumscribed movable tumor below the skin of the lower lid. It was either a fibroma or a serous cyst. It was transparent to transillumination.

Atypical Familial Retinitis.

POLACK and FROGE showed a mother and two daughters with similar retinal lesions. They were greyish, vascularized hyperplastic areas very similar to those of retinitis proliferans, with round red or orange colored nodules, very vascular, becoming pale on pressure. Wassermann negative.

Retinitis of Pregnancy.

VALUDE and LAVAT presented a woman who had grave general symptoms during pregnancy, accompanied by retinitis. Abortion was followed by rapid amelioration. There remained only a slight arterial hypotension with a few ophthalmoscopic lesions and slight diminution of vision.

Traumatic Exophthalmus.

POULARD and BAILLIART reported a case of traumatic exophthalmus treated by ligation of the two common carotids.

Traumatic Papillary Stasis.

BOLLACK and P. MERIGOT DE TREIGNY reported a case of traumatic papillary stasis.

Pupillary Reflex in the Screech Owl.

ROCHON-DUVIGNEAUD reported on the pupillary reflex in the screech owl.

Atrophy of Optic Nerves.

ABADIE regarded this as cured by cervicodorsal spinal trephining, followed by evacuation of the cerebrospinal fluid. Believing that the cause of the atrophy was the contraction of the retinal arteries, Abadie attempted to prevent this by influencing the vasomotor spinal centers. This he did by trephining in the region of the ciliospinal center, with evacuation of the fluid. In the patient, one eye which still had perception of light was improved, the other was not affected.

DISCUSSION.—Polack thought, that for an operation as dangerous as this, it would be necessary to see the patient before as well as after the operation, and not to be too quick in accepting the cure.

Spontaneous Rupture of Eyeball.

TERRIEN and GOULFIER reported a man of 70. There had been a quick, terrible pain followed by a profuse hemorrhage thru a large corneal rupture. Anatomic examination showed a retrochoroidal hemorrhage which had forced out the contents of the eyeball.

Terson had seen several cases in glaucoma. There is always a weak spot in the cornea which is the origin of a large tear. The cause of the hemorrhage might be a decompression or an active congestion. Enucleation can sometimes be avoided by excision of the extruded tissue.

Diagnosis of Dyschromatopsia.

POLACK and LONGUET say that Daltonism is in reality a trichomatism with lessened perception of green. It is frequent and should be sought for systematically. Holmgren test is insufficient. The color box of Maxwell is necessary.

C. L.

BUFFALO OPHTHALMIC CLUB

January 21, 1921.

Glaucoma After Cataract Extraction.

This paper read by Dr. Edward Stieren has been published in full, p. 424.

DISCUSSION.—Dr. Cowper had seen one case of this kind operated on by another member of the society. A year or so later she appeared with a bullous keratitis. It seemed more than a coincidence that bullous keratitis should occur in this particular class of cases, as Dr. Stieren has mentioned. This case he saw was relieved by trephining and has remained comfortable but without much vision on account of a scar on the cornea. Dr. Stieren spoke of the tonometric tension in a case of this kind. He would like to ask if he would consider that an accurate record in view of the altered corneal surface.

Dr. F. Park Lewis. I have this day had a case of glaucoma following combined extraction made some two or three months ago, in which the vision was 20/15. The patient had apparently no difficulty at all until he came to me with vision reduced to 20/200 and discomfort in the eye, and marked increase in tension. I think Dr. Stieren has given a very fair estimate of the published knowledge of the vitreous but we have not begun to touch the end of it. I have made some experiments with animals in which I showed an exfoliated structure. I have one specimen which is like an opening rosebud. There is no question whatever that instead of the vitreous being a mass of fluid in a framework, the vitreous is one of the most highly involved bodies in the eye. I have another specimen from the ox in which the vitreous has not yet unfolded but in which the layers are interlocked and I think I have a third specimen in which can be outlined a series of tubules extending from the back portion of the eye up to within a millimeter of the posterior capsule of the lens in a series of curves, the openings being toward the disk. It evidently is a series of lymphatics which in the clear vitreous are absolutely invisible and are brought out when the reactions of various reagents are applied. I have two human specimens, one of a man who had a glaucoma for which the eye was removed. A web-like membrane extends from the pos-

terior portion of the vitreous to the back portion of the lens and a definite attachment is evident between either the posterior capsule or some structure back of the posterior capsule, occupying a third of the lens tissue. In this specimen is another feature which I think of importance, the optic nerve is swollen to nearly double its regular size. I am under the impression that we are not altogether in the right track in assuming that it is the spaces of Fontana that are chiefly involved. I think Parker is right in assuming that there perhaps are two kinds of glaucoma, one in which the pressure is from behind and in which he believes operative measures on the back portion of the eye are preferable; but I think that occurs more frequently when there is a deep anterior chamber. Another feature that has appealed to me in the study of animals' eyes is the extremely glassy character, from which, of course, the vitreous takes its name, of the posterior capsule. It is only under peculiar conditions that we get the opacity in which there is a definite exfoliation like the leaves of a rosebud.

Dr. A. C. Snell. I have a feeling like Dr. Lewis that glaucoma following cataract extraction is not so rare. At the present moment I have two patients who are suffering from glaucoma following cataract extraction. At the time of the operation everything went along smoothly, but the patients developed nausea and vomiting. There was a low grade iritis, without exudate on the capsule and glaucoma following rather early. In one case the glaucoma was noticed in three months and in the other in one month. In one case I did an Elliot which was a failure and in the second I did a Lagrange and this was a failure. Vision was 10/200. I then did a posterior sclerotomy with temporary improvement. I have two other cases which are of a different type, in which we had a very favorable result following a period of three years. I did a Lagrange in the first place followed by disaster. In fact the primary vision of 20/60 went down after the operation and never became better than 10/200. We did a cataract

extraction on the other eye with a good result. In a woman of the same type I decided to stick to miotics and in a period of over three years the tension has never been very high. It ranges from 25 to 30 mm. Hg. and occasionally a little higher, but she has lost no vision. In considering the etiology of these cases I believed that we always had an iritis, and that our glaucoma was due to the blocking of the spaces of Fontana.

Dr. A. G. Bennett. I have unfortunately seen a few cases following extraction and I have one on hand now which I operated on last week: a comparatively young woman of 42 on whom the operation was done more for the appearance than the idea of obtaining any vision. She had had the cataract since childhood. I did the operation without iridectomy and she went to her bed with a clear pupil. I used atropin in her eye once a day for the week she was in the hospital. I then allowed her to go home with a shade and ordered atropin once a day. At home she used it three times a day and the next day she came with a typical glaucoma. I used eserin and she responded to miotics. There was no debris in the anterior chamber, but there was a little loss of vitreous. I agree with Dr. Stieren that these probably are due to the vitreous plugging up the spaces of Fontana.

I have had in my experience about half a dozen cases of glaucoma following extraction. I rarely do an iridectomy. However, in one case in which I had glaucoma I did the combined extraction. He, however, recovered under eserin. In two of my cases I had a bullous keratitis.

Dr. H. M. Weed. I recall two cases of glaucoma both of them in elderly women. The first operation was done by the combined method. Both had good vision following the operation. This first case I did not see for some time afterwards. She returned with one eye blind. This all happened perhaps ten years ago. She still had good vision in the unaffected eye. The second case was also an elderly woman from out of town. She had a preliminary iridectomy. One particular

thing I remember about her case was that she had the highest degree of astigmatism following the operation of anyone I ever saw. She had some 6 D. of astigmatism, and with the correction she had 20/20 vision. She returned some few months later with considerably reduced vision in that eye and she had a tension of 50 mm. Hg. Schiötz. I did a corneo-scleral trephining below. The tension was reduced and, until she died three or four years later, she lost no vision.

Dr. L. M. Francis. One thing that occurs to me in this connection; Dr. Stieren has said nothing about the possibility of preexisting glaucoma or glaucoma tendencies in these eyes. Sometimes it is very difficult to make a diagnosis of chronic glaucoma. Is it possible that these operations were done upon eyes that would in the ordinary course of events have developed glaucoma anyway? I would like to know if the glaucoma was probably the result of the epithelial lining of the anterior chamber or was it due possibly to vitreous in the anterior chamber. The chairman of the meeting will probably have something to say concerning the change in the anterior chamber in relation to glaucoma which after all perhaps is the most interesting phase of this subject.

Dr. E. E. Blaauw. The subject is very intricate and very difficult. It occurs to me that we have to deal with two types of glaucoma, malignant and benign. The benign cases yield to miotics, the malignant do not. I think the malignant type is due to an ingrowth of epithelium filling up the anterior chamber, and with these you cannot do anything. The third case was a case of cyst of the anterior chamber. I would like to raise a question with Dr. Lewis. I think in connection with your study of the vitreous in different animals that what obtains in animals does not obtain in human beings. The human lens is only comparable with that of the ape. Prof. Stilling found the human vitreous a canal, which probably contained lymph, but limited by a membrane. He built on that a theory of accommodation. He thought the vitreous in the anterior

part was contracted by the ciliary muscles and the fluid in the posterior part would be thrown back to the optic nerve. That has not been accepted. The thing is ten years old. I would like to ask Dr. Stieren if those cases which have been extracted without a conjunctival flap are not more liable to develop glaucoma, because the epithelium can more easily grow into the anterior chamber and form a cyst. I think he also mentioned that sometimes one of the two pillars of the iris getting into the wound produces glaucoma, and also the vitreous gets into wound and produces a chronic irritation. Is it possible to detect glaucoma? It can be seen with the corneal microscope and the Nernst lamp that there is a deposit of pigment, which adheres to Descemet's membrane, more than we expect to see, in old people and you see pigment deep into the crypts of the iris. Koeppe in Halle states that these conditions lead up to glaucoma. There they always examine the cornea and iris before beginning to dilate with atropin. We ought to study, of course, the angle of the anterior chamber, which is also possible with the Nernst lamp.

Dr. Stieren. As I expressed in the beginning of the talk these cases came at different periods of time, and I did not make any intensive study of them. Dr. Francis asked whether I looked at the anterior chamber with the corneal microscope, and whether I could recognize vitreous in the anterior chamber. It is not possible. Dr. Blaauw's question is answered in part as to the three different types of cases. The third case may have been an epithelial cyst in the anterior chamber. Literature records four or five cases in which the epithelium grows into the anterior chamber. The bullous keratitis I always thought to be due to an increase of tension. Risley's suggestion that mere paracentesis of the anterior chamber where the increase of tension may be due to the presence of vitreous in the anterior chamber is a good one. As to the exciting cause I do not think we know what the exciting cause is. I have seen glaucoma disappear after removal of a wisdom tooth, also fol-

lowing the removal of a tooth with an apical abscess. Lamb of Washington uses adrenalin and ductless glands. I do not think the loss of vitreous has anything to do with the formation of glaucoma. The vitreous chamber fills up, not with vitreous of course, but with a fluid.

Sclerosing Keratitis.

DR. ALBERT C. SNELL, Rochester, N. Y., presented Mrs. E. R., 68 years of age. Present trouble began in July 1920 during convalescence from an attack of erysipelas of the entire left side of face. When the swelling of the eyelids subsided, a dense white spot was noticed on the left eyeball.

August 6th, 1920 first ocular examination. A densely opaque oval sector was seen extending from the temporal limbus into the cornea $\frac{1}{3}$ the corneal diameter. It involved the deep stroma, and in its center the dense opacity had a yellowish tint. The remaining cornea was very clear, and there was a very sharp demarcation between clear cornea and opaque. There was a slight elevation of tissue at temporal limbus surrounded by scleral and conjunctival inflammation. No ulceration. No staining with fluorescein. No vascularization of cornea. Slight iritis. Moderate pain. No temperature.

The opaque sector gradually extended into the cornea until two months later it involved $\frac{2}{3}$ the corneal diameter, leaving a crescent shaped area of perfectly clear cornea. Four months after the onset, vascularization began at the temporal limbus, and now (seven months after onset), has reached the center of the opaque yellowish area, extending from above also. No pain for past two months. At no time was there any ulceration of the corneal tissue. Intraocular structures not involved.

DISCUSSION. Dr. L. M. Francis. I have seen three cases that resemble this in part, but not to the same extent; they were not so large. The lesion began in the corneal stroma and at no time was it possible to elicit a stain from the epithelium.

One was in a case of a girl of twenty whose process went on. In that case

I opened up and curetted the contents out. Another case which was very carefully studied, had a very bad alveolar process. The teeth had to be extracted following which this condition began to quiet. The third case, like the first, was in a healthy young person. That is, an infection occurred by the blood stream, picked up by the lymphatics, and the growth was excited in the deeper corneal layers. These cases all showed a slight anesthesia of the cornea over the area. There were no bacteriologic findings. In the one case I opened up no organisms were present in the growth.

Dr. Ed. Stieren. The only case I had to approach it was in a patient eight or nine years of age. You could press the contents from side to side. I made an incision at the limbus and it was a clear yellow fluid. No culture was taken. It was distinctly in the stroma of the cornea.

Dr. Price. I reported a similar case a few years ago, where the cornea became opaque and I brought this patient to Dr. Hubbell. Very shortly after that the patient developed tuberculosis and died. I always believed the trouble to be a tubercular infection.

CHICAGO OPHTHALMOLOGI- CAL SOCIETY

March 21, 1921.

Divergent Squint.

Dr. Thos. D. Allen (by invitation) presented the following case: This boy was brought in a little over a month ago with a divergence of the right eye, drooping of the right lid, nausea, vomiting, and headache. He was put into the hospital immediately for diagnosis. The diverging attacks began about three years ago and recurred every week to every month. The longest one preceding the present was the first and it lasted eight days, the succeeding ones lasting only about three or four days.

The nausea and vomiting associated with the headaches and divergent squint in the right eye have been rather aggravating. Upon covering one eye, they stopped immediately. Vision in the eye was very

poor. It was exceedingly difficult to have him do anything, such as chase balls across the room, because he would not cooperate well. Evidently there was vision in the right eye, the left eye being the fixing eye.

Examination revealed the spinal fluid absolutely normal; his blood was negative to the Wassermann test. He had, however, a leukocytosis of approximately 41,000, with 55 per cent lymphocytes. Subsequent counts during his stay in the hospital have gradually come down to normal, with the last reading 9,000, and the polymorphonuclear leukocytes over 50 per cent and lymphocytes 25 per cent. The ptosis has gradually diminished since he has been in the hospital until it is only slightly visible. The divergence has also gradually diminished, and the diplopia decreased, so that now there is none present at all. He can go around without any covering over his eye. There is some little asymmetry of the face. The right pupil has been dilated continuously, and it is impossible for him to move the eye more than a few degrees beyond the horizontal line.

He has been on Dr. Rothstein's neurologic service. A diagnosis of migraine has been made, but that is very questionable.

DISCUSSION

Dr. William H. Wilder said that these cases must be very uncommon. He thought he had seen but one before, and that seemed to be of the kind that was described by the neurologists as recurrent palsy occurring with migraine.

The Blind Spot.

DR. HARRY S. GRADLE read a paper in which he gave a short review of the history of the discovery and investigations of the blind spot from the time of Mariotte to date. The various methods of study of the blind spot were then discussed, and particular emphasis was laid on the use of one or the other forms of tangent screens for the accurate delineation of the normal scotoma. Too short a distance between the screen and the patient was decried because minute variations led to a great error. Equally, too great a

distance tends to emphasize the importance of the normal neutral zone surrounding the blind spot.

The findings regarding the blind spot in myopia, sympathetic ophthalmia, eclipse blinding, retrobulbar neuritis of accessory sinus origin, and medullated nerve fibers in the retina were then discussed in more or less detail. These were compared with the normal blind spot as measured with the author's magnet scotometer.

In conclusion it was urged that more attention be paid to the careful delineation of the blind spot as many points of great clinical assistance can be deduced from such study.

DISCUSSION. Dr. William H. Wilder stated that the question of arrangement of the fibers of the optic nerve as they emerged at the optic disc was an interesting one. The suggestion that was originally made, later confirmed by Fuchs, was that the peripheral fibers of the optic nerve were those that supplied the parts of the retina in proximity to the optic disc, while intermediate and peripheral zones of the retina were provided by fibers that were in the intermediate and central parts of the nerve. This seemed the most natural explanation but it was by no means proven, because there were other observers (Collins, Mayou and others) who held that just the reverse obtained; namely, that the peripheral portions of the retina were supplied by the peripheral fibers of the optic disc, and the intermediate and central areas by fibers more centrally placed in the nerve. The latter view did not seem so attractive because it would mean that the portions of the retina nearer the optic nerve would have to be provided by fibers that would come out from the nerve and then dip down thru the various layers of the retina to the recipient layer.

However, in practice he thought one might meet some cases which would seem to indicate that the latter view was just as tenable as the former. For instance, in cases of deep physiologic cupping of the optic disc on the temporal side of the nerve head, if hypertension of the eyeball occurred, the

vitreous could be readily forced into this cup and would exert pressure on the delicate nerve fibers of that side of the optic disc forcing them against the firm unyielding scleral ring. Such pressure would be likely to injure first those fibers lying next to the firm ring. It had been satisfactorily demonstrated that the macular and para-macular fibers occupied a space in the temporal quadrant of the optic disc, and pressure on these could produce the paracentral scotoma so frequently observed as an early sign of glaucoma. But above and below this segment of macular fibers, lay those destined for other parts of the retina and the well observed fact that contraction of the inferior or superior nasal field was also one of the early signs of glaucoma would seem to lend support to the idea that fibers going to parts of the retina concerned with the nasal fields must have been early subjected to severe pressure and the damage probably would be greater to those fibers lying next to the firm scleral ring.

Dr. Gradle has emphasized the importance of studying the blind spot in our clinical investigations. Probably this, like field taking was frequently neglected by the busy practitioner. Taking fields was very irksome and time consuming and hence might very easily be done carelessly and with inaccurate results. The utmost care was necessary on the part of the observer to see that the patient did not give the wrong information, and the observer must be on the alert at all stages of the examination. So there was a double source for subjective error. Speaking generally, he supposed field taking was about the most inaccurate examination that the average ophthalmologist did. If this was true of our perimetric measurements, it was probably equally true of our measurements of the blind spot, and in this one had been further hampered because until quite recently instruments for the purpose had been rather imperfect.

The introduction of the Bjerrum screen was a valuable improvement for it was impossible to outline the blind spot with any degree of accuracy

with the ordinary perimeter. The cam-pimeter of Peter was a valuable instrument and he had found it much more practical than the larger Bjerrum screen, although possibly not so accurate. He had recently been using with satisfaction the stereocampimeter of Lloyd, with which he thought he obtained even more accurate results, for the patient's attention could be more concentrated.

With exceptions, enlargement of the blind spot would seem to indicate pathologic conditions. It might occur from disease in adjacent cavities and spaces, the sinuses, and ethmoid cells, and this emphasized the importance of being able to measure this peculiar scotoma carefully and with all the accuracy possible, because it might be a deciding point in the whole case, and it might be, after carefully excluding all other causes for a suddenly developing blindness in one eye, that one had to rely on the measurements made of the normal blind spot as a guide or indication for operative procedure on the sinuses. In such cases it would seem that there was a reason for the theory that Fuchs advanced, that the peripheral fibers of the optic nerve head were those that supplied the contiguous area of the optic disc or nearby areas of the retina; and yet this was not absolutely proven by such an occurrence because it might be that in some of these cases the trouble in the optic nerve, particularly if it was in the canalicular portion, might result from edema in the central portion of the nerve from infection passing thru the small vessels that entered it.

As to enlargement of the blind spot, which appeared as an early sign of glaucoma, Bjerrum, and later his followers, Seidel, Rönne and others, pointed out that this was not so much an enlargement of the blind spot, as it was an area of blindness, beginning in some instances as a paracentral scotoma, that became linked up with the normal blind spot and it was that which Bjerrum laid particular emphasis upon. Seidel stated that there would be a sickle-shaped blind area upward and downward or both, that was connected with the normal blind spot.

These signs he had observed in the examination of early glaucoma and they emphasized the importance of a careful study and record of the condition of the blind spot in these conditions.

Dr. Gradle in closing the discussion said: The blind spot was not always oval, and not always round, particularly in the higher degrees of hypermetropia, where one found the blind spot more round than oval. The blind spot did not lie in the exact position depicted. It might have its greatest diameter above the horizontal median line or below as it was usually depicted. It might be comma-shaped or pear-shaped. It was usually jagged, due to projection of the larger vessels. On the average it would show a fairly oval blind area with the majority (approximately two-thirds) lying below the median line.

There were certain phases of examination which favored the Collins and Mayou idea of a central location of the peripapillary fibers from the retina, but such a location involved the idea of retinal decussation of fibers, which was something that had not been shown anatomically. It was difficult on that basis to explain many of the phenomena concerning enlargement of the blind spot that were found particularly in accessory sinus disease. He was inclined more to the probable, but not absolutely proven theory of Fuchs as to the peripheral location of these fibers in the intrakanalicular portion of the optic nerve.

The most vulnerable portion of the nerve was the macular bundle and pressure would yield central scotoma far sooner than anything else. If the peripapillary fibers which dominated the outlines of the blind spot were located centrally, one would expect an enlargement of the blind spot with central scotoma in every case, but quite the reverse was true. Where there was central scotoma the blind spot enlargement was a secondary affair, if present at all. When there was enlargement of the blind spot as one of the early symptoms of retrobulbar neuritis, the central scotoma seldom, if ever, appeared. That would lean more

toward the theory of the peripheral location of the fibers rather than central. Furthermore, the course of the retinal fibers showed no decussation of fibers, and the course of the retinal bundle could be studied carefully. If these fibers came from the center of the optic nerve or rose up to the center of the physiologic excavation, the fibers could be seen by the modern methods of ophthalmoscopy.

A Simplified Intranasal Operation For Obstruction of the Naso-Lacrimal Duct.

DR. ROBERT H. GOOD described a simplified intranasal operation on the lacrimal sac and tube, which he said could be readily performed by rhinologists and ophthalmologists.

The nose is thoroly anesthetized with adrenalin and flakey cocain. The lower canaliculus is dilated, and with a syringe a few drops of a 10 per cent. solution of cocain in adrenalin are introduced into the sac. In nervous patients it is wise to inject the intraorbital nerve with novocain and administer one-quarter grain of morphin hypodermically one-half hour before operation. He has occasionally injected novocain between the sac and the lacrimal bone as well as into the lacrimal groove.

The anterior end of the inferior turbinate is removed with bone forceps as close as possible to its attachment and just beyond the duct opening. A grooved lacrimal probe is now introduced thru the lower canaliculus and passed thru the naso-lacrimal duct into the inferior meatus of the nose. The probe should be as large as can be passed without force and without injury to any structures. An incision thru the mucous membrane is made from high up just in front of the middle turbinate down to the edge where the inferior turbinate has been removed, terminating just anterior to the probe. The membrane is elevated forward and backward, which makes two triangular flaps with the apices above. A special nasal chisel hollowed out with dull corners is placed at the anterior crista of the inferior turbinate. About one-quarter of the circumference of the bony wall is chis-

eled away. The anterior portion of the lacrimal bone, and the posterior portion of the frontal process of the superior maxillary bone have a depression on the orbital side in which lies the lacrimal sac, and the depression causes a bulging or convex elevation in the nose over the sac which makes it easier to chisel. This elevation of bone is chiseled off up to about the middle of the sac. A small crow beaked knife (curved bistoury) is now placed into the groove of the lacrimal probe, and the duct and half the sac incised. The flaps readily fall into place and the operation is completed. There is no aftertreatment required. By using a chisel, instead of bone forceps, we avoid injuring the membranous duct, and a larger section of the bony canal can be removed, and one can always have the lacrimal probe for a guide. By biting off the anterior end of the inferior turbinate one can do no harm to the duct. The flaps do not need to be sewed as they remain in place. A longitudinal incision thru the sac causes much less trauma than the removal of a section of the sac, and if the incision is long it drains better and there is no danger of cicatricial contraction of the sac.

It has been a common practice for years to slit the canaliculus in cases of dacryocystitis, but this practice is hitching the horse to the wrong end of the wagon. An eye with a slit canaliculus never looks normal nor drains the tears as readily as a normal canaliculus. This should never be done except in lesions in the canaliculi or upper portion of the sac.

Some operators describe the slitting of the inferior canaliculus as a part of their procedure in doing an intranasal operation on the sac. This destroys the capillary action of the canaliculus and makes the gravity of the tears practically nil, as the distance from the artificial opening in the sac to the common opening of the canaliculi is extremely short.

The essayist has not failed so far to restore the function in any case that he has operated, and he has not carried out any after treatment whatever except the use of a few drops of adren-

alin 1/20,000 in the eye morning and night, and occasionally injecting a little argyrol into the canaliculus with a syringe to demonstrate to himself and to the patient that the argyrol comes out thru the nose.

The author then detailed five cases in which he had performed this operation with gratifying results.

DISCUSSION. Dr. William H. Wilder asked Dr. Good to explain what he did in cases in which there was a dense stricture that was absolutely impermeable. Did he use force in passing the probe thru the bony duct? Did he expect the duct, in which there was an impermeable stricture, ever to function again? Would it remain open after such an operation? Would there not be a continual contraction of the stricture as before, when the slit in the side of it closed?

Dr. Sidney Walker, Jr., asked Dr. Good in regard to the bacteriology of the conjunctival sac following these operations in cases of chronic dacryocystitis, where a cure was to be performed, and further as to what methods were employed for irrigation of the sac, and whether it was necessary.

Dr. Good spoke of putting a few drops of argyrol into the sac itself. He had caused an argyrosis in that way, and he should rather think argyrol would be contraindicated in such cases.

Dr. Harry S. Gradle said that it stood to reason that Dr. Good's procedure was not indicated in such a tear sac where there was stenosis or stricture in the upper portion of the sac or the lacrimal canal superior to the sac. It was of value only where the stenosis was below the median half of the sac or nasal duct.

The anterior ethmoidal cells were in intimate relationship with the upper portion of the lacrimal apparatus, and was it not extremely probable that a large percentage of cases of so-called dacryocystitis were purely secondary to ethmoidal disease, and that some of the cures that were affected by various types of operation were due to removal of the primary source of infection by the spontaneous cure of the ethmoiditis?

According to the figures from some of the foreign clinics, about 80 per cent of extirpations of the sac were failures, in that they failed to restore the function of the normal tear passage, so that the tears did not have free access to the nose, and 40 per cent of the Toti operations failed to show free passage of the tears in connection with the use of argyrol.

There was one other procedure that should be mentioned, the method of von Szily of taking roentgenoscopic pictures of the tear passages. He injected a small amount of barium or thorium sulphate, with a fine syringe into the tear passage, and then he took a roentgenogram of the passage. This gave an exact outline of the tear passage as far down as the fluid could be syringed, and the location of the stricture could be determined and the type of operation to be employed was more readily available.

Personally, he did not believe anything like the last word in regard to tear sac operation, had been said, and would not be until some operation which would restore the function of the lacrimal passage to its natural state had been devised.

Dr. George F. Fiske said that the operation described by Dr. Good was extremely useful and could be employed in many cases. After all, cases in which there was stenosis of the lacrimal duct were not common. This operation was adapted to those cases where the trouble was at the lower end.

Dr. Good, in answer to Dr. Wilder's first question about stricture, said that he proceeded without the probe. He chiseled away the inferior turbinate which formed the inner wall of the bony duct, then the probe went down into the nose and he proceeded.

He had had two cases of double fracture of the superior maxilla in which he did this operation.

In answer to the other question, if there was destruction of the mucous membrane in the sac, or if one had cicatricial tissue obliterating the sac, this operation did no good. In a case like that, perhaps the old method of extirpating the sac might be the best,

but very few sacs needed to be extirpated nowadays.

ROBERT VON DER HEYDT,
Corresponding Secretary.

SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.

DECEMBER 16, 1920

DR. G. ORAM RING, CHAIRMAN.

Extensive Choroiditis.

DR. KRAUSS presented a man, aged twenty-one years, suffering from plastic choroiditis of sudden onset in the left eye. He had clouding of the vitreous, with a large mass of exudate in the choroid, in the upper part of the field. As the exudate absorbed, choroidal changes remained. The cause of this exudative choroiditis was obscure. The Wassermann was found negative, but the von Pirquet reaction was positive and the family history was negative. The patient is a large, robust adult, apparently in the very best of health. Much improvement, followed the use of iodid of potassium.

Traumatic Dislocation of Lens.

DR. KRAUSS presented a man, aged fifty-six years, who was struck by a brickbat on the right malar bone. He developed immediately an intense chemosis of the lids with great proptosis of the eyeball. There was a small laceration of the lower lid near the outer canthus, and large irregular, slightly elevated triangular opacity of the cornea with little inflammatory change. No hemorrhage was apparent in the deep anterior chamber, nor reflection of blood from the deeper chamber, tho the vitreous excluded all light. The eye was blind except to the strongest light stimulus.

The X-ray showed no fracture of the orbit nor of the surrounding bones.

At present the cornea shows peculiar gray-white punctate opacities, covering the area occupied by the corneal lesion. The pupil is widely dilated, showing a very narrow rim of the iris.

The anterior chamber is very deep with a black pupil.

Ophthalmoscopically.—There are a few fine vitreous opacities. When the

patient looks down, in the extreme lower part of the fundus, the edge of the lens can be seen apparently attached to the zonula. When the eye is moved up and down, the lens swings toward the center of the vitreous as tho attached to a hinge. The eyeground is well seen. The nerve is gray-white, the arteries extremely contracted, the veins comparatively full. Scattered thru the ground, especially in the macular region, the choroidal pigment is heaped irregularly, but there is no evidence of rupture. He can count fingers at one foot and has an apparently good light field.

These conditions have suggested a diagnosis of rupture of the ciliary body, complete dislocation of the apparently clear lens, with partial optic atrophy and choroidal changes.

The intensity of the blow was apparently carried into the soft structures of the orbit, without fracture of the bones. An intense orbital hemorrhage and chemosis of the orbital tissues resulted in proptosis. The peculiar opacities in the cornea and the lack of reaction, which the presence of a foreign body in the cornea would bring about, indicated a trophic change. The almost complete blocking of the retinal artery may be secondary to the nerve and retinal changes, rather than any direct effect of the blow. A rupture of the optic nerve would probably have resulted in a greater loss of visual field, and more pronounced atrophy.

Tay-Sachs Disease.

DR. LEIGHTON F. APPLEMAN reported a case of amaurotic family idiocy in a patient aged fifteen months, the first-born of Hebrew parentage, who appeared to be normal up to six months of age.

After this time the parents noticed that it became dull, apparently losing its sight, muscularly very weak and flabby, and at the present time unable to hold its head up nor to sit up or walk. It cannot move its arms—in fact, it is perfectly relaxed, altho apparently well nourished.

Ophthalmoscopic examination reveals both optic discs oval, clearly outlined, but atrophic. Each macular re-

gion shows the typical picture of this disease—a white area about twice the diameter of the disc, with a cherry red spot in the center. The vessels and peripheral portions of the eyegrounds appear normal.

No history of consanguinity of the parents was elicited. Both parents were healthy—no history of lues and no abnormality of the eyes were found in either.

Attention was called to the pathologic findings in these cases previously reported and to the etiologic factors which have been thought to cause the condition. Treatment is unavailing.

Resection of Sclera for Detached Retina.

DR. CHARLES R. HEED exhibited a patient showing the result of a modified Müller operation. The patient had a broad detachment, practically the entire temporal retina, for one month previous to the operation. There was complete absence of the nasal field (hemianopsia), with eccentric vision of 6/LX. Five weeks following the operation, fields for 10 mm., white and red were normal and central vision equalled 6/XXI partly. The ophthalmoscopic picture of the retina disclosed little or no displacement, except at the site of scleral section, where a moderate elevation of the retina was noted.

Dr. Hansell said that any treatment, medicinal or operative, that can effect cure in retinal detachment is worthy of consideration and trial. Dr. Vail, in the *November Archives of Ophthalmology*, contributes a thoughtful article concerning the etiology. He suggests that in most cases, if not in all, of idiopathic detachment the secretory glands of the ciliary body have ceased to functionate. Hence the aqueous humor becomes more and more reduced in quantity and the relation between the pressure in the posterior part of the globe and the anterior becomes changed. The withdrawal of normal tension causes passive hyperemia of the tunica vasculosa. This allows diapedesis and transudation. He says that the usual operative measures

do not cure more than one out of 1,000 cases. The next article, by Edgar S. Thomson, tells of seven cases out of 75 cured by trephining the sclera and immediate aspiration. Müller's operation is designed particularly for detachment in high myopia. Dr. Heed is to be congratulated on his skill and attention to minute details in the performance of the operation on his patient and in the satisfactory result. The procedure must appeal to us as worthy of trial in all cases in which the sclera is too large for the ocular contents.

Case of Coralliform Cataract.

DR. WILLIAM ZENTMAYER exhibited a patient who was brought because her vision was too poor for her to continue her studies. She was an Italian child, aged seven years, who had in each lens a typical coralliform opacity. By oblique illumination parts of this opacity were seen to be distinctly crystalline. Vision: right eye = 5/60; left eye = 5/20. Corrected vision: right eye, 5/20; left eye, 5/15. This hereditary type of cataract was until recently supposed to be due to a fault in the development of the lens, but recently Verhoeff has had the opportunity of examining a lens presenting this type and found the opacity to be made up of crystals. Thoro chemical and microscopic examination failed to determine their nature. Verhoeff assumed them to be protein, being probably derived from myelin, which he found to be normally present in an infantile lens examined by him. He supposed the crystals to result from this substance thru deficient calcium metabolism. Some question had arisen as to whether the case presented should be operated on at the present time. From the vision, as determined scientifically, operation may seem uncalled for, but since the child cannot continue with its studies, operation would seem defensible.

DISCUSSION. Dr. Posey advised needling the eye with poorest vision, without making any effort to recover the crystals. After the successful completion of that operation and the assurance of good vision in one eye, he thought Dr. Zentmayer might risk the removal of the remaining lens *in toto* for the pur-

pose of obtaining the crystals for analysis.

Dr. McCluney Radcliffe advocated the more radical operation of removal of the lens in its capsule, in order to prevent the danger of some of the crystals dropping into the anterior chamber and setting up a persistent irritation. He stated that the operation should be done under complete general anesthesia, using either the Noyes or the Ziegler loop to remove the lens. When done in that way, he considered it a perfectly safe operation, as he had frequently employed it without the slightest loss of vitreous.

Case of Locomotion Pulse.

DR. ZENTMAYER showed a man, aged twenty-four years, suffering from aortic regurgitation. He came to Wills Eye Hospital because of the developing of proptosis of the right eye. Locomotion pulse involving the entire arterial retinal tree was present in the right eye.

Pernicious Anemia.

DR. ZENTMAYER presented a man, aged thirty-one years, in whom a diagnosis of pernicious anemia had previously been made and was confirmed by Dr. Musser. The changes in the eyes were not typical. Both fundi were rather pale and there was a low-grade neuroretinitis in the left eye and a marked pallor of the optic nerve head in the right eye. The contrast between the artery and the vein was not as pronounced as in normal eyes. In the extreme periphery of the right eye there was the remnant of a small hemorrhage apparently from thrombosis of a venule.

Diabetic Retinitis.

DR. ZENTMAYER showed a man, aged fifty years, who came because of smoky vision, which had begun three months ago. He considered himself in perfect health. In both eyes the retinal exudation was of the massive type. In the left eye the saccular exudation was surrounded by a zone of hemorrhages and on either side of almost all arteries there was a broad white strip about one-half disc diameter in width. In the right eye the changes were similar, but not so pronounced. The right temporal vein was thrombosed. The

urine contained a high percentage of sugar.

Gunshot Wound of the Orbit.

DR. WM. CAMPBELL POSEY exhibited a case of gunshot wound of the head involving the orbit. The bullet of a 38-caliber revolver fired at very close range struck the subject, a young colored woman, midway between the eyes, and entering the head thru the nasal bone was split into two large fragments and a number of smaller ones either by the bone or by the quite heavy goldfilled bridge of a pair of spectacles, which fortunately were worn at the time of the accident. Scarcely stunned by the shot the patient walked several squares to the Howard Hospital, where the left eye was found to be somewhat proptosed and diverged and almost blind. The right eye was unaffected. The fragments of shot revealed by the x-ray were all in close association with the sphenoid bone. The large fragment on the right side fortunately stopped just short of this cavity and was lodged in the posterior ethmoidal cells; the fragment upon the left side had apparently fractured the inner wall of the orbit and injured the optic nerve in the foramen, the nerve showing later the characteristic signs ophthalmoscopically of optic atrophy and vision being reduced to hand movements. Several of the smaller fragments had been removed by the rhinologist to the hospital, but the two large fragments just referred to were permitted to remain *in situ*. The external wound healed rapidly and at no time was there constitutional or local symptoms with the exception of those referred to.

Eye Symptoms in Obscure Brain Disease.

DR. HOWARD F. HANSELL reported the case of a boy of nine years suffering from attacks of intense headache, projectile vomiting and delirium lasting several hours.

The ocular symptoms on admission consisted of unequal pupils only slightly contracting to light; double choked disc; star-shaped, bright, glistening figures in foveal regions three or four times the size of the disc; retinal hemorrhages; complete left hemi-

anopsia; nystagmus on forced rotation. V = R. 6/60. L., hand movements.

The symptoms of disease of the cerebrospinal nervous system on admission were slight weakness of the left arm and leg; no inequality of the face; slight incoordination of the left arm with adiadochokinesis; distinct asynergia of the left leg; the reflexes were normal and there was no loss of sensibility. The neurologist detected hemianopic pupillary reaction. X-ray, urinalysis, blood, nose and accessory sinuses negative.

The conclusion drawn from the complete Bárány test was that "the lesion appears to be in the upper half of the pons on the right side, not involving the posterior longitudinal bundle, and below the floor of the fourth ventricle.

The boy's faculties have deteriorated during the several months of observation. He has lost weight, mentality, equilibrium and muscular power.

The ocular complications comprise all of those commonly associated with brain tumor and by their very variety and number excludes the possibility of localizing value. They point to a gross lesion involving the pons, the cerebellum, the optic tracts and the primary optic centers. It is only by assuming that the lesion is extensive, that there has been an increase of intracranial fluid which would naturally be associated with it that the symptom may be explained. Dr. Dercum believes that the neoplasm developed first in the cerebellum, especially in the right side and extended forward to involve the corpora quadrigemina. Death ensued October, 1920, eleven months after the first symptoms appeared.

J. MILTON GRISCOM, M. D.,
Clerk.

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

February 16, 1921

DR. H. B. LEMERE, Chairman.

"Prisms, Bases In." This paper was read by DR. F. W. DEAN.

DISCUSSION. DR. J. M. BANISTER, Omaha, uses prisms bases up and

B. Potter thinks in considerable sufficiency all in need be taken in account, such as his address and any consideration of his past action, whom he has been seen making it appear, and the like individual circumstances; however, that very few of them are good nutritive.

patients comfort after other methods in the hands of good men have failed.

S. R. GIFFORD,
Cor. Sec'y.

COLORADO OPHTHALMOLOGICAL SOCIETY.

March 19, 1921.

W. C. FINNOFF, presiding.

Syphilitic Disease of Retinal Vessels.

J. A. McCRAW, Denver, presented a negress aged 38 years who had come complaining of somewhat indefinite disturbances of the left eye dating back about five years. She could not use her eye at night and light hurt it. Ophthalmoscopic examination showed that almost the nasal half of the disc was covered with a dull grayish membrane, which also extended on to the retina for a half disc diameter. This membrane protruded 4. or 5. D. into the vitreous, and had the general appearance of a retinitis proliferans. Extending from the disc downward and toward the nasal side as far as could be seen was a dull grayish band about the width of one of the larger blood-vessels, and which apparently consisted either of old exudate or of scar tissue completely covering a branch of the central artery or of the obliterated artery itself; the condition being that known as endarteritis obliterans. In close proximity to the vessels were numerous patches of gray exudate deeply pigmented with retinal treatment. The case was regarded as of syphilitic origin.

Anterior Staphyloma.

E. E. McKEOWN, Denver, presented a woman aged 23 years whose cornea was highly staphylomatous, there being nearly five mm. of protrusion. The eye had suffered a lacerating injury at sixteen years of age, the iris prolapsing. Four years after the injury an operation was performed, the nature of which was uncertain, but which was said to have been done to keep the eye from protruding further. The patient was now beginning to have some pain. The vision was reduced to light perception, and the surface of the cornea was generally hazy. The posterior

segment of the eyeball seemed to be normal.

DISCUSSION.—J. M. Shields, Denver, thought that the eye would very likely have to be enucleated.

F. R. Spencer, Boulder. Cauterization of the cornea might help, preferably in an area away from the region of the traumatic iridectomy. An operation might be tried for lowering the ocular tension, which even if it is normal is relatively too high for the resistance of the cornea. Verhoeff of Boston uses a flat cautery, and deals with about a fourth of the corneal surface at each cauterization.

C. A. Ringle, Greeley, thought that any operation on this eye or even leaving it as it was would risk its becoming dangerous to the other eye. Enucleation would be preferable.

C. E. Walker, Denver. The objection to removing an eye that has some sight and is not likely to produce sympathetic trouble is that if anything happened to the second eye the sight of the first eye might be greatly valued.

Right Optic Atrophy, Left Dislocated Lens.

E. E. McKEOWN, Denver presented a woman aged 44 years who had come to find out whether a left cataractous dislocated lens could be removed. There had apparently been a similar condition in the right eye, which had been operated on some years previously. The operation had apparently been well performed, but the patient was under the impression that immediately after the operation for the removal of the cataract the vision of the right eye had disappeared, and there had been no subsequent recovery. The right optic nerve was atrophic. The cataract in the left eye had fallen back into the vitreous, but altho the upper part of the fundus of this eye was clearly visible and apparently normal, the optic nerve could not be seen. The patient believed that the formation of cataract in both eyes had resulted from a nervous shock due to lightning striking near her.

DISCUSSION.—C. E. Walker, Denver. It would be advisable to make an in-

cision above, leaving a bridge of cornea, and then withdraw the knife and remove the speculum. The incision should then be completed with scissors, and the lens extracted by passing a vectis behind it and making counter-pressure as the lens was brought forward. The blindness of the other eye complicates the question as to the advisability of operating on the left eye.

Edward Jackson, Denver. The patient apparently gives a history only of mental shock due to the lightning, but the history of gradual loss of sight in the course of a year or so is such as might be obtained after the direct action of lightning upon the eye. In a personal case blindness from cataract formation had come on very gradually after a lightning stroke in the mountains, and cataract operation was successfully performed twenty-seven years after the injury. In Dr. McKeown's case the question of taking a certain amount of chance as to the outcome of the operation should be squarely put up to the patient.

Interstitial Keratitis.

J. M. SHIELDS, Denver, presented a youth aged 18 years who for the past eight years had had interstitial keratitis of one or both eyes with later resulting disturbances. At the present time both corneas showed triangular areas of opacity, with the bases downward and the apices extending to the center of the cornea. In each eye there was marked posterior synechia, but in the right eye this had given way to a considerable degree under atropin and dionin. At the age of ten years the patient had had an attack of so-called inflammatory rheumatism with effusion into both knee joints. At the age of eleven years both eyes became inflamed at short intervals and the case was diagnosed as one of interstitial keratitis. The patient had been under treatment of various kinds until about a year before the date of report. A negative Wassermann test had been obtained, but in addition to the effusion into the knee joints and the interstitial keratitis, the presence of inherited syphilis was supported by Hutchinson teeth and by a deafness which was not explained by any evi-

dence of previous inflammation. It was therefore proposed to initiate antisyphilitic treatment.

DISCUSSION.—G. F. Libby, Denver, commended the treatment of the case as a syphilitic in spite of the negative Wassermann. Two months previously he had examined a typical case of binocular interstitial keratitis in a girl of nine years, whose former ophthalmologist had refrained from giving mercury because the Wassermann was negative. Two further Wassermann tests proved positive (plus two), and the case progressed favorably under the addition of mercury to the treatment. Another case, that of a girl of fourteen years, was referred because the family physician was not satisfied with a previous diagnosis of tuberculous keratitis. In the left cornea of this patient there were the typical appearances of interstitial keratitis, and there were also characteristic Hutchinson teeth. Specified treatment was instituted and recovery was complete in three months, only a faint nebula remaining and vision reaching 5/12. In this case a Wassermann test was not obtained, but the evidence pointed to inherited syphilis.

Perforating Injury.

J. M. SHIELDS, Denver, presented a man aged 40 years who on February 11, 1921, had been injured by a spike which flew up and struck the right eye. The perforating wound extended from the lower central part of the cornea downward and inward well into the sclera, and the iris presented in the wound. A good deal of vitreous was lost during removal of the protruding iris, so that no further interference was attempted but the eye was closed under a pressure bandage. X-ray examination showed no intraocular metallic foreign body. The eye was now quite quiet, vision had recently been recorded as 20/200, and it was proposed to attempt to save the eye.

Optical Iridectomy.

J. M. SHIELDS, Denver, presented a man aged 39 years whose left eye had received a lacerating injury from a piece of coal eighteen months previously. The eye was not painful but there was very little vision. There was

a vertical scar in the left cornea in line with about the temporal boundary of the normal pupil. The iris was caught in the wound and the nasal half of the iris was pulled completely across the normal pupillary area. Light projection was very uncertain. Was an optical iridectomy advisable?

DISCUSSION.—E. M. Marbourg, Colorado Springs, suggested that the operation called for was an iridotomy, which could be repeated if necessary, an iridectomy being impracticable because the iris was bound down in all directions.

C. E. Walker, Denver. In a case similar to this in which the lens was not present, I tried to make an iridectomy, but there was a sort of membrane behind the iris, and altho the two pieces of iris are out of the way the membrane, probably exudative, still remains. I am therefore rather doubtful as to the advantage of going into this kind of eye.

E. R. Neeper, Colorado Springs. If the lens is cataractous in this case I do not see how we can do the operation suggested by Dr. Marbourg. My idea would be to make a buttonhole in the iris, going in with the De Wecker scissors. After such an operation one might be able to decide the condition of the lens and what further to do.

Wharton-Jones Operation for Ectropion.

W. C. BANE, Denver, presented a man aged 40 years whose face had been burned by a gasoline explosion in 1905. Scar formation had resulted in ectropion of both lower eyelids and of the inner end of the left upper eyelid. The right lower eyelid had been operated upon by the Wharton-Jones method, that is making a V-shaped incision which after dissecting the scar from the deeper tissue was sutured in the form of a Y. The result was apparently quite successful. The same operation would be done later on both left eyelids.

Sclerosing Keratitis.

G. L. STRADER, Cheyenne, Wyoming, presented a woman aged 28 years whose right eye had been inflamed at intervals for the past five years, usually during hot weather, and who

had come in August, 1920, complaining of inflammation in this eye of two or three weeks standing. In the first attack five years ago both eyes had been red but the right was worse. In August, 1920, there was scleral and episcleral inflammation downward and outward from the right cornea. There was some marginal involvement of the cornea, and a hair like opacity extending toward the pupil. This opacity did not stain. There was very little pain or photophobia. The fundus and media were clear, and the vision of this eye was 20/30+. The left eye was apparently normal, and had vision of 20/40+. The teeth, nose, and general health were normal. After improving for a few weeks, the patient was not seen again until February, 1921. The inflammation had subsided, but in January she had noticed a corneal opacity and poor vision. The vision of each eye with correction, however, was 20/20. The right eye was not red, but there was a dense interstitial opacity of the lower outer quadrant of the cornea, triangular in shape and extending to the corneal margin. The opacity thinned out toward the pupil. There was one rather large bloodvessel deep in the corneal substance. In the upper outer quadrant of the left cornea was a small triangular opacity two by three mm. which had been observed in August, 1920. The family history was negative, and two children born since the trouble first appeared were perfectly normal. A Wassermann test had not been made. The condition seemed to agree with Fuchs' description of sclerosing keratitis.

D. H. Coover, Denver, said that he had seen some cases of this character clear up under Griffith's mixture, which contained iron and aloes.

W. H. Crisp, Denver, referred to a case having a certain amount of resemblance to that presented by Dr. Strader, in which the condition had rapidly improved under the use of tuberculin.

Dr. Strader (closing) said that the patient gave a history of some miscarriages a few years ago, and this might lend color to the supposition that the cause was syphilis.

Plastic Improvement of Cicatricial Eye Socket.

W. C. FINNOFF, Denver, presented a young man who in June, 1920, had been struck by the blade of a revolving automobile fan, which had cut completely thru the lower vertical third of the left upper eyelid at the junction of the outer with the middle third of the lid, had cut thru and destroyed the eyeball, necessitating enucleation, and had completely divided the entire thickness of the lower lid at the junction of its inner with its middle third. The case was operated upon by a general surgeon.

When the patient was first seen by Dr. Finnoff on February 2, 1921, the lower lid was greatly retracted by the scar, which left an unsightly V-shaped deformity. The upper lid was drawn into the orbit by a well marked band of scar tissue. This band was divided on February 25, and a cast made of dental modelling compound was placed in the orbit to prevent union of the cut surfaces. Six days after this operation a small artificial eye was retained in the socket. On March 16 the deformity was entirely corrected by a plastic operation on both lids. This operation was analogous to the operation usually done for the correction of hare-lip, the deformity being overcorrected so as to allow of the development of a normally shaped lid margin by subsequent cicatricial contraction. One third of the stitches were removed twenty-four hours after the operation, a second third on the following day, and the remaining third at the beginning of the fourth day.

Epithelioma of Eyelid.

W. C. FINNOFF, Denver, presented a man aged 47 years who four or five years previously had first noticed a small tumor on the right lower lid. The tumor was excised at that time. Recurrence was noticed four or five months previous to the date of presentation and progressed rapidly. When the patient was first seen by Dr. Finnoff there was an ulcer eight mm. in diameter extending from the lid margin down into the cul-de-sac. The ulcer had an angry appearance and had completely perforated the tarsus.

Another roughened area, about the size of a split pea, was noticed on the margin of the lower lid at the inner canthus. Five weeks and four weeks ago respectively two exposures had been made to the lower lid with twenty-five mg. of radium. At the time of presentation all signs of activity had disappeared, and the site of the epithelioma was replaced by fibrous tissue.

Injury to Eye from Steel.

Dr. Finnoff also presented a man aged 44 years, whose right lower lid had been burned in 1916 with a piece of hot steel. At the end of a year the wound was still not entirely healed, and the ulcerated surface was curetted and otherwise treated by a dermatologist. The surface healed and remained in this condition for six months, at the end of which time it again broke down, and the ulceration later extended to the ala of the nose. When the patient was first seen in December, 1920, there was a large ulcerated area involving the cheek and the right side of the nose. The lower eyelid had been entirely destroyed, and the ulceration extended back under the globe and into the maxillary sinus. The patient refused to permit enucleation and evisceration of the orbit, with removal of epitheliomatous tissue from the nasal sinuses. On December 31, 1920, twenty-five mg. of radium was applied to the epithelioma for a period of four hours over each area until all accessible parts of the growth had been treated. In two weeks a marked improvement was noted, and the ulcerated areas were filled in with epithelium and scar tissue, but recurrence in the orbit and nose was expected unless the patient consented to surgical intervention followed by radium application.

DISCUSSION.—F. R. Spencer, Boulder, referred to a series of cases reported upon a year or so ago by a writer whose name he did not remember, but who advocated leaving the antrum permanently open in such cases, so that it could be watched for recurrence. In every case complete surgical removal was desirable and radium was used.

W. M. H. CRISP, Secretary.

SPECIAL REPORT, LT.-COL. HENRY SMITH IN PHILADELPHIA.

L. WEBSTER FOX, M. D.,

PHILADELPHIA, PA.

These are observations on a Clinic held at the Medico-Chirurgical Hospital Graduate School of Medicine, University of Pennsylvania, May 19th, 1921, at which intracapsular extraction of cataract and other important ophthalmic operations were demonstrated by Lt.-Col. Henry Smith, formerly of Amritsar, Punjab, India.

It seldom happens to the average surgeon to witness the work of a genius, in such profusion away from his natural habitat, as has occurred within the past few days in this city, and it seems fitting that the observations of this work should become a matter of record. Such comments or criticism as we may have of his operation are best reserved for such time when the end results are at hand to justify the criticisms. Some of the points of his technic are a trifle startling to say the least, but, on the whole, he has acquitted himself as a surgeon of no mean ability, and as one who was thoroughly at home with his chosen field of work.

The program of this particular clinic covered cataract extractions, iridectomies for postoperative occlusion of the pupil and iridectomies for glaucoma, with a practical demonstration of the intracapsular operation upon pigs' eyes.

Colonel Smith's armamentarium consists of an irrigator, good illumination, eye speculum, Graefe knife, fixation forceps, scissors such as we use in muscle operations (not conventional iris scissors), an especially devised lid elevator, blunt hook of the size used in muscle operations but more heavily mounted, a heavily mounted broad flat director curved on the flat, and box of cigars concealed about various parts of his person. The last seems to be as essential as the first, and it is no libel to state that the operator smokes during the clinic between operations and frequently maintains the cigar in his mouth during the operation, but with the characteristic dexterity does not allow the ashes to drop within the field of operation. The assistants and onlookers are not permitted the same privilege, however, and this slight may be responsible for some animus in the

noting of the more important work. This feature of the operator's work has been outstanding in all of his American clinics and has served to create such a startling impression that due justice may not have been given to the operation itself.

The preparation of the patient seems to have mattered little to the surgeon just so long as he (the patient) had the condition for which an operation was indicated. This after all should be the real preparation. It is to be regretted very often that it is not so considered. However, in all these cases my preparation had been followed to the letter until the patient was brought into the presence of Colonel Smith.

He noted that in all the cases, the cocaine anesthesia was attended by mydriasis, and inquired whether atropin had not been used, and further remarked that the cocaine must be unusually good over here; from which we must infer that he must use in his work either less than four per cent solution, or a grade of the alkaloid inferior to ours, or else he begins operation in his own hospital before anesthesia is complete. There were no signs that the cocaine had been used too profusely in these cases, the cornea showed no desquamation or wrinkling. Colonel Smith allows six minutes for anesthesia. Nearly all the patients had the eyebrow on the affected side shaved, but in one or two a shift was made to an eye not so prepared, but it was of no consequence to the operator.

In passing it may be noted that one washing of the hands seemed to have sufficed for several operations. The speculum having been introduced, the eye and conjunctival cul-de-sac were thoroly flushed with 1 to 4,000 bi-chlorid solution. He is keen for free flushing. The speculum he prefers is

is the Smith speculum, not one of the fixed stop variety. Having freely flushed the eye, he gently expresses the excess of fluid out of the cul-de-sac by running his thumb over the closed lids. One would think he were pressing heavily upon the lids, but a repetition of this movement convinces one he is doing something very clever.

Being right handed he stands behind the patient, except when operating on the left eye, in which case he stands to the right for the incision only. The assistant stands to the left. The incision is made with a Graefe knife or modification. The point of entrance of the knife is at the sclero-corneal margin and corresponds to the horizontal meridian, or 180 degrees, and after traversing the anterior chamber emerges at a similar point in the sclero-corneal margin on the other side. Colonel Smith lays great stress upon the necessity of adhering to these directions, and emphasizes above all things the necessity of a broad incision. There is nothing hesitating in the way he makes this incision, using only a forward movement before he brings it to a conclusion in the conjunctiva above. This is accomplished largely by making the heel of the knife describe a portion of an arc. In this series nearly all had conjunctival flaps, whether by accident or design is left to conjecture, as the Colonel is a worker not a talker.

Fixation forceps are then given to an assistant, who grasps the conjunctiva and subconjunctival tissue near the lower margin of the cornea, holding these structures out firmly. The operator then grasps the iris in a manner all his own,—the idea being to hold one of the blades of the iris forceps stationary while the other one moves. Try it. This is done by grasping the forceps with the thumb and first finger, then the second finger is used to impart motion to the adjacent blade. The fixed arm or blade is inserted in the wound just inside the superior corneal margin—the moving blade strokes (or scrapes) the cornea gently, expressing the iris into the grasp of the two blades as the margin of the incised cor-

nea is reached. It is then pulled out gently and snipped off with the unusually heavy scissors previously referred to. The operator stopped to demonstrate the proper way to hold scissors, using the thumb and third finger—this way they could be made to cut. Incidentally he supported the heel of the scissors on the base of the patient's nose while the unoccupied fingers of the hand holding the forceps retracted the brow and steadied the hand on the patient's forehead. This entire procedure obviously does not make for a very large iridectomy. One operation without any iridectomy demonstrated that it was not absolutely necessary.

The speculum is then removed (not over gently it would appear). The motion being outward, its removal seems to occasion no distress. An assistant then holds down the lower lid and fixes the head at the same time in a very definite manner. The hand, for the most part, embraces the lower jaw while the thumb is extended and holds down the lower lid by pressure of the ball of the thumb directly below the inferior bony margin of the orbit, a small dry pledget of absorbent cotton intervening to prevent slipping. The upper lid is drawn away from the globe and somewhat up by an especially constructed lid elevator and supported thus by the assistant's other hand. Another assistant raises the redundant upper lid tissues out of the way and fixes it at the same time by pressure of the thumb against, or slightly above, the superior orbital margin. A specially trained assistant does this work alone.

The operator then pressed directly backward on the cornea with the point of the blunt hook at what would appear to be a point opposite the pupillary margin in these cases. This is much below the horizontal diameter. The pressure is exerted directly backward toward the optic nerve. The wound then gapes. The curved flat director is introduced at the margin of the wound with the concavity facing anteriorly. According to circumstances, the heel of the blunt hook may

be used instead of the blunt point. As soon as the lens is felt to leave its base in the hyaloid fossa of the vitreous, the blunt hook presses the cornea up in close contact with the inferior margin of the rotating lens so that it, in a measure, occupies the space left vacant by the lens. Meanwhile the director above receives the lens in its concavity and is inclined slightly forward guiding the lens outside of the globe. The action of the pressure on the cornea was demonstrated in several of the cases by a marked concavity in the corneal surface immediately following instead of the usual convexity. Loss of vitreous happened in only one case in this series.

As the lens leaves the interior of the eye it is frequently fixed on the exterior of the cornea by lateral extensions of the suspensory ligament which are still united. These are released by gentle use of the blunt hook and the lens is removed from the eye. The object of the original pressure on the cornea it seems is not so much to rupture the suspensory ligament as it is to dislocate the lens from the hyaloid fossa—the rupture of the ligament's attachments being of secondary importance.

The toilet of the wound consists of snipping off any extended bead of vitreous, and of introducing the end of the blunt hook into the angles of the wound to replace any shreds of iris. Incarceration of the iris in the angles of the wound is a complication especially to be avoided.

While in but one case of this series was there any vitreous expressed (and it was normal in consistency), two others which were known to have fluid vitreous did not suffer any loss. Fragmentation of the healthy vitreous from too much pressure after the lens had left its moorings was probably the cause—the fluid vitreous could suffer no such fragmentation and was retained by the close contact with the moving lens. It may, therefore, be reasoned that the loss of the healthy vitreous is of no great moment in these cases. With proper assistants and technic, it does not appear that this

event should follow any more frequently in this than in the ordinary extraction. The retention of the weakened posterior capsule is no more protection than the close following up of the cornea on the emerging lens.

There is no postoperative irrigation of the eye and no instillation of atropin. Both eyes were closed. White's ointment was used to cover the lids. Bandage was applied to remain ten days.

In passing, the patients experienced no unusual pain or distress in any part of the operation. The iridectomies were not at all distressing to the patients.

In one case of iridectomy for glaucoma, the operator displayed unusual dexterity in the manner in which his incision was made. The point of the Graefe knife was introduced about 3 mm, above the visible edge of the cornea, the point of the blade entering the anterior chamber, and was then made to describe quickly a portion of the arc of a circle emerging with a scimitar-like sweep a short distance away in the conjunctiva without apparently having entered the anterior chamber. It was reminiscent of the manner of certain abdominal surgeons who cut down to the peritoneum with one stroke of the knife but who leave the peritoneum untouched. The incision when completed, however, was the same incision we are accustomed to see made with great deliberation and often mental anguish. The iridectomy was completed in the manner previously described.

A case of bilateral occlusion of the pupil following complications of cataract operations done elsewhere received the operator's attention, and he successfully performed an iridectomy, although not without some difficulty. His resourcefulness with a limited number of instruments was the subject of commendable comment. His therapeutics suggested the mid-Victorian era and we felt a trifle jarred at the order for ten grains of blue mass to restrain the reaction anticipated in this case. His preliminary treatment in the majority of his cataract patients is as follows: Ten grains of blue mass twenty-four hours

before operation and the night previous *eighty to one hundred grains of bromid of soda at one dose* (in solution). These suggestions were carried out to the letter in all the cases constituting the clinic.

While the operator is physically a large man and unquestionably a strong one, he was far from clumsy, and showed a familiarity with his subject that certainly was enviable. There was no shake to his hand, no uncertainty, no hesitation in the steps of his operation,

and no brutality. The pressure exerted by his fingers (not by his hand or arm) was wholly in his keeping—he stopped it as he wished. Colonel Smith has also the rare faculty of inspiring his patients with perfect confidence. To be sure the personal peculiarities of his technic will arouse criticism, but here we are reminded of Abraham Lincoln's reply to the report that General Grant drank too much whiskey in which he said, "Find out the kind of whiskey and give it to the rest of the generals."

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JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

AMERICA'S WELCOME TO OPHTHALMIC VISITORS.

We gladly cut down the space usually devoted to editorials to publish at once the special report from Dr. Fox and the correspondence of Dr. McReynolds (in a letter to Dr. Melville Black), telling of the visit of Col. Smith to this country, of the educational work he is doing, and the appreciation of his personal character and professional accomplishments shown by his American colleagues. Col. Smith is a man of strong personal character in which are many points that arouse the sympathy of American ophthalmologists. Many of the leaders in ophthalmic practice in America have taken up their work in communities of undeveloped scientific institutions and but little sympathy for or interest in ophthalmic progress. Here they have been pioneers in specialization thru superior preparation soon acquiring extended practice in which they must be prepared to meet every surgical emergency without

skilled counsel and without the best assistance. These conditions are all being rapidly changed but developing under them many Americans can understand the conditions, the labors, and the satisfactions of Col. Smith's practice in India.

Other visitors from Europe are now in this country, of whose work we hope to have some account later. It will doubtless be of benefit both to the visitors and their hearers and students, altho they may not evoke the personal interest so strikingly shown in the clinics of the famous Indian surgeon. American ophthalmologists do dearly love to peer over each others shoulders and watch an operation.

Several other visitors of world wide reputation are expected to visit us this year, and it is hoped that this rising tide of old world interest in American ophthalmology will reach its flood next spring, with the assembling of the Washington Congress. However successful that meeting may be in itself we venture to predict that those

who come to it will remember the occasion, and be themselves remembered, quite as much for what they see and do in other parts of the country, as for any part in the formal proceedings of the Congress.

E. J.

PHOTOELECTRIC CURRENTS IN THE EYE.

The recent astonishing development of our conceptions as to the nature of electricity and the part played by it in the constitution and phenomena of matter, has naturally reopened interest in the biologic activities. From this point of view Sheard (*Physiologic Review*, 1921, I, p. 84) has submitted to critical analysis our notions as to the retinal mechanisms and reactions involved in the generation of visual sensations. "The process by which the ether disturbance causes a visual impulse may be ascribed to (a) chemical action, (b) molecular strain, (c) electrical action."

According to the chemical theory it is supposed that certain "visual substances" in the retina are decomposed by light and are reformed in darkness. The transformations of chemical energy involved in this play of katabolism and anabolism in some way excite the sensitive elements of the retina and generate visual impulses. Kühne's discovery of the photosensitive "visual purple" seemed to offer so exact a homologue of the silver salts of the photographic plate, that great strength was given to the chemical view of retinal stimulation. But the facts that visual purple is confined to the retinal rods and is absent from the cones, that it is lacking in the retinae of many animals possessing keen sight, and for other reasons, it seems certain that this pigment is but of secondary importance.

Edridge-Green, perhaps the most noteworthy contemporary investigator in the physiology of vision, is a firm proponent of the chemical theory of stimulation. He writes: "A ray of light impinging upon the retina liberates the visual purple from the rods and a photograph is formed. The rods are concerned only with the conveyance of the light impulses to the brain. The ends of the

cones are stimulated thru the photochemical decomposition of the visual purple by light, and a visual impulse is set up which is conveyed thru the optic nerve fibres to the brain. The character of the stimulus and impulse differs according to the wave length of the light causing it. In the impulse itself we have the physiologic basis of the sensation of light and in the quality of the impulse the physiologic basis of the sensation of color." (*The Physiology of Vision*, 1920, p. 263.)

What may be called the mechanical theory of retinal stimulation depends upon the conception that the vibration amplitude of the atoms composing some visual substance of the retina is increased or decreased by the impinging light waves according to their own frequency. It may be called a resonance theory, since it postulates, in effect, increased energy of atomic vibration under the impact of light waves whose frequency is harmonic with the atomic period, sympathetic vibration. "The excursions may be so increased in extent by the rhythmic energy supplied by the light waves that the atoms will leave the parent molecules and produce new molecules."

It is supposed that the chemical energy liberated by this mechanical shaking apart of molecules is the direct source of nervous stimulation. As Sheard says: "From the viewpoint of modern science we may regard it as fairly certain that the first stage in any photochemical reaction consists in the separation of negative electrons under the influence of light. According to the theory of Grotthus, we may say that 'the action of a ray of light is analogous to that of a voltaic cell,' that is, the chemical action of light is essentially electrolytic in nature. Hence the electrical theory supposes that the visual impulse is the concomitant of an electrical impulse; that an electrical current is generated in the retina under the influence of light, and that this is transmitted to the brain thru the optic nerve."

The biologist, let alone the purely medical man, has not the training to fit him to critically weigh these physical conceptions. Recent physics presents to him

something like a midsummer madness, mingled inspiration and phantasmagoria. His reasonable attitude is that of an agnostic; to sit tight, look, listen and treat theory tenderly.

All observers agree that when the poles of a galvanometer are applied, one to the back and the other to the front of the freshly isolated eyeball, a beam of light projected thru the pupil causes a deflection in the galvanometer. Long ago Kühne and Steiner showed that this electrical variation was a property of the retina alone. The current is vital, a concomitant of life; it fails in the dead organ. Gotch found that the range of light variations within which the frog's eyeball gives definite photoelectric responses corresponds closely to the range of vision in the case of our own color sensations; that is, the photoelectric response is excited only by the luminous fraction of the spectrum. Nevertheless, a positive response is obtained when light is suddenly replaced by darkness. Different colored lights vary in their photoelectric effects in two ways, namely, in the length of the latent period of excitement and in the intensity of the current produced. The latent period of reaction is also greatly shortened by increasing the intensity of the stimulus.

Gotch infers the existence of two photochemical substances in the posterior pole of the eyeball, one of these reacts to light and the other to darkness.

Waller found no changes in the photoelectric reactions which suggested the relations of complementary color sensations; all colors produced are electric response of the same sign and direction, "more or less powerfully according as they are more or less luminous."

Summarizing the indications from many observations, Sheard, concludes that, "The action of luminous stimulation upon the retina must lie without doubt in the ionization processes set up on the visual receptor cells. What these processes are or what the nature of the changes produced is still an enigma. However, ionization involves a dissociation into positively and negatively charged atoms and electrons. A stimulation by light must, therefore, set up a process of ionization whereby the posi-

tive ions may be thought of as moving in general in one direction, and the negative atoms (if such exist) and electrons as moving in opposite directions. The cerebral state corresponding with any condition of retinal stimulation consists simply in the presence in the cerebral cells of the specific ions which are liberated in the retina by the action of the light."

HENRY SEWALL.

BOOK NOTICES.

Manual of Ophthalmic Operations.
F. P. Maynard, F.R.C.S. (Eng.).
Lt. Col. I.M.S. (Retired), etc. Second Edition, 268 pp. 137 illustrations and 6 stereoscopic plates. Calcutta and Simla, Thacker Spink and Co. Edinburgh, E. S. Livingstone.

Of India and China with their teeming millions and inadequate development of hygiene and prophylaxis, the western surgeon thinks as a field of great opportunity to perfect his operative methods and skill. Out of the former have come the Smith-Indian operation for cataract and the Elliot trephining, that have excited wider interest and discussion among ophthalmologists than any other operative procedures proposed in the last generation.

Not a few American operators of recognized standing have traveled round the world to make themselves familiar with the technic of extraction in the capsule. It is natural that young surgeons should turn to the ripened judgment of the late Professor of Ophthalmic Surgery in the Medical College of Calcutta, for important help in choosing among the myriad ophthalmic operations proposed in the literature of today.

This work is not an encyclopedia of operations that may be done on the eye and its adnexa; but a clear concise account of those procedures that have been found most valuable in practice. More than one procedure directed to the same end may be given; but many are wisely ignored, in the interest of brevity, clearness and definiteness of teaching.

The first 75 pages deal with such general matters as: Preparation of the Patient, Surgeon and Assistants, Operation

Room, Instruments, Dressings, etc., and General and Local Anesthesia. Under the latter we notice a tabular comparison of eight local anesthetics and adrenalin, as to their mode of action, mode of use, advantages and disadvantages, that must be very helpful to the young surgeon in getting the leading facts of this subject clearly arranged and firmly grasped. The type error, omitting H from holocain, is a little puzzling at first glance, suggesting that among the numerous drugs put forth as anesthetics is one that had not before been heard of.

Chapter IV takes up special operations, Iridectomy, Iridotomy, Anterior and Posterior Sclerotomy and Sclerectomy. Chapters V to VIII inclusive, 57 pages deal with operations on the Lens. After that come single chapters, each for Operations on the Conjunctiva, Cornea and Lids, the Lacrimal Apparatus, Removal of Foreign Bodies, Enucleation and Its Substitutes, Operations on the Orbit, and Squint Operations.

The descriptions here given are not clouded with unnecessary words; but with the help of the illustrations will be found clear and most helpful to the novice. Yet the widely read ophthalmic surgeon will find much to ponder, both regarding what is here included and what is omitted, that will help to throw light on his choice of methods. In general make up, the work corresponds closely to that of the "Manual of Ophthalmic Practice" by the same author, which we recently noticed (v. 4, p. 57). This second edition comes after an interval of several years since the first edition was exhausted. The great war was responsible for this interval, and in this edition we have some references to facts learned during that period of unexampled activity.

E. J.

Augenärzliche Eingriffe. Ein kurzes Handbuch für angehende Augenärzte. Von Professor Dr. J. Meller, Wien. Zweite Auflage. 460 pages, 219 illustrations, 1 plate. Vienna and Leipsic, Josef Safar, 1921.

Meller's Ophthalmic Surgery is well known and popular in America where

the translation by William E. Sweet, which was called a "Second Edition," was published in 1912. This edition, bearing the date 1921, shows still further revision and some important additions to the text while the number of figures used to illustrate the text has been increased by 46.

Among the most important additions is the one describing the Kroenlein method of resecting the orbital wall. This occupies 9 pages and is illustrated by 8 figures. It is followed by a description of the operation of L. Müller for relief of choking of the disc. In the accounts here given of orbital operations, and of others, we find a more detailed account of the methods of producing local anesthesia by nerve block, than usually accompanies descriptions of ophthalmic operations.

Chapter XV, dealing with the extraction of foreign bodies from the interior of the eye, has been considerably developed, and now occupies 19 pages. More than any other, perhaps, it shows the lessons learned during the Great War regarding the treatment of war wounds. The account of tonometry has been extended in recognition of its increased importance as an indication for the various operations for the control of ocular hypertension.

The concluding chapter on minor ophthalmic operations continues to be a valuable feature of this book. In it are considered such procedures as exposure of the conjunctiva of the upper lid by turning over Grönholm's spoon, hypodermic injections, the operative treatment of pterygium, trachoma, and chalazion and the duties of the assistant in ophthalmic operations. These are things that bulk large in the work of the young ophthalmic surgeon.

The book is still one that will be most helpful to the young operator who is developing his own technic. It puts at his service the best of standard methods without confusing him by reference to suggestions of less importance or unproven value.

E. J.

Nursing in Eye, Ear, Nose and Throat Diseases. Second Revised Edition, by A. Edward Davis, A.M., M.D., and Beaman Douglass, M.D.

Some years ago we gave a favorable review to this book and again extend our commendations. It has been written primarily for the use of nurses, but students and general practitioners will, we believe, find it of great assistance to them also. It is not a treatise in any sense of the word, but is meant simply as a guide for the intelligent care and nursing of the various diseases of the eye, ear, nose and throat, and to instruct the nurse as to her exact duties during and following operations upon these organs.

Antisepsis and asepsis have received particular attention, since, above all, the nurse should know the all-importance of surgical cleanliness. The methods of preparing the numerous antiseptic and sterile solutions and dressings have been given in detail, while the various remedies required in the treatment and nursing of these special organs, their preparation, sterilization and exact method of application have been considered fully and most carefully. In fact, we have endeavored to show the nurse how to do things and correctly, because, in treating such delicate organs as the eye, ear, nose and throat, the good results obtained depend fully as much upon the intelligent and painstaking care of the nurse as upon the work of the physician himself.

A brief outline of the anatomy and physiology of the eye, ear, nose and throat has been given in order that the nurse might better understand the subjects under consideration.

Dr. Davis has written the chapters on the eye; Dr. Douglass those on the nose, throat and ear.

In the second edition of this little volume every chapter has been carefully revised, new matter incorporated and an entirely new chapter on Vaccine and Serum Treatment added.

This book will be of material assistance to special surgeons in training nurses, as well as, to those who are studying the special procedures necessary for nursing. It is well printed, bound in linen and illustrated where necessary.

H. V. W.

CORRESPONDENCE.

Col. Henry Smith at Dallas.
Dear Doctor Black

I have just received your note of regrets and you do not know how very much we would have enjoyed having you with us on the occasion of the Colonel's visit. We really had a wonderfully successful clinic at which, perhaps, as many ophthalmologists were in actual attendance as have ever attended any ophthalmologic clinic in this country. Colonel Smith and Dr. Fisher thought it was the largest attendance of ophthalmologists they had seen at any clinic. We had twenty-two operations, embracing a variety of conditions. The operations were mainly for senile cataract, congenital cataract, aftercataract, lowering of updrawn pupils and glaucoma. You will be glad to know that his patients are getting along beautifully and are having, as a general rule, no reaction whatever.

I had a great deal of difficulty in arranging for the Dallas Meeting because of the fact that the Colonel's address before the New York Academy of Medicine followed so closely upon his engagements in Ohio that it hardly gave us time to insert the Dallas engagement. I then went to Washington, took up the matter with General Ireland, and the Air Service, with the result that the War Department very cheerfully agreed to place at Col. Smith's disposal a De Havilland plane in order that he might make the trip from Cincinnati to Dallas and back in time to fill his New York appointment. However, the Ohio men agreed, later, to shorten their program so as to enable Col. Smith to visit Dallas by rail.

I went to Columbus to see his clinic there, which was the largest with regard to operations that he has so far held. There were about fifty-five cataract extractions altogether at Columbus. I then went with him to Dayton where we had a very excellent meeting and about twenty-five operations.

We then went down into Kentucky, Clarence King, Vail and a few others, where we were joined by Drs. J. A. Stucky and Will Stucky and Dr. W. M. Offutt who took charge of us for a two days tour thru the Bluegrass region of

Kentucky. We visited a large number of the most important stock farms in the Bluegrass and saw many wonderful animals, from Man-of-War down. You would have been astonished to observe the very intimate knowledge which Col. Smith has of all kinds of live stock, and the managers of those various stock farms were delighted to discuss with him the fine points of interest in connection with the science and art of Animal Husbandry. They gave us a wonderful time in Kentucky, and then we returned to Cincinnati for the clinic on Monday, the 9th, which was very delightful in every way. We had there about twenty cataract operations. That night we had an address before the Cincinnati Academy of Medicine, and the following morning we had a breakfast at the Sinton Hotel where a number of local oculists were present to bid us *bon voyage*. We took the train at eight o'clock over the B. & O. for St. Louis, where John Green and Hardy, and others, met us at the station. After a minute's chat, we took the train for Dallas, arriving on the afternoon of the 11th. Col. Smith and Dr. Fisher were guests in my home while they were here, and they were presented at the President's reception of the Texas State Medical Association on the evening of the 11th. We had about a thousand members of the State Association here.

On the morning of the 12th. we had our ophthalmologic clinic at St. Paul's Sanitarium extending from nine o'clock till two, and in the afternoon we had a symposium on cataract, Col. Smith reading his oration on "Intracapsular Cataract," while Dr. Fisher followed with a paper on "The Accidents to be Avoided in the Intracapsular Cataract Operation," and your humble servant closed with a review of "The Status of Intracapsular Cataract Operations in North America with an Analysis of the Procedure and the Results."

The following morning we made some more operations at St. Paul's Sanitarium and then the Colonel and Dr. Fisher left on the afternoon train.

It might interest you to know that large sums of money have been offered the Colonel as compensation for his operations, but he has positively refused to

accept a dollar, saying that he does not intend to return to Europe with his pockets filled with American gold, that his purpose is to bring before the ophthalmologists of America what he considers some important truths in Ophthalmic Surgery.

JNO. O. McREYNOLDS.

The Colorado Congress

To the Editor: The Colorado Congress of Ophthalmology and Oto-Laryngology will meet in Denver, Colorado, July 29-30, 1921. As usual all ophthalmologists who find it convenient to take these days as part of their vacation in Colorado will be welcome.

The preceding days of the week, July 25-28 inclusive, will be filled with a special series of lectures and demonstrations of the Summer Course in Ophthalmology, given in the University of Colorado at Denver. These will be open to those attending the Congress.

Those who will undertake to present papers at this meeting of the Congress may communicate with Dr. William C. Finnoff, 318 Majestic Building, Denver, Colorado.

BIOGRAPHIC SKETCH

GEORGE THOMAS STEVENS, M.D., Ph.D.

Dr. George Thomas Stevens was the son of Rev. Chauncey Coe Stevens and Lucinda Hoadley Stevens. He was born in Jay, Essex county, New York, on July 25, 1832, and died at his residence, 350 West 88th street, New York City, on January 30, 1921.

His childhood and early youth were spent in Elizabethtown and Crownpoint, New York, where his father was a Congregational minister. He received his early education in the schools of the county and thru studies with his father, who was a man of high literary attainments.

He received his medical education at the Castleton, Vermont, Medical College where he graduated in medicine in 1857. He commenced the practice of medicine in Wadhams Mills, Essex county, New York. On April 17, 1861, he married Harriet Weeks Wadhams of Wadhams

Mills, New York. Their children are Frances Virginia Stevens, who married Prof. George Trumbull Ladd of Yale University; Dr. Charles Wadham Stevens, who married Marion Duncan Paine, now practicing ophthalmology in New York City; and Georgina Wadham Stevens, who died in childhood.

At the outbreak of the Civil War in 1861 he was commissioned an Assistant Surgeon in the 77th Regiment, New York State Volunteers. He was later made Surgeon and for two and one half years was operating surgeon of his Division. He served in all the campaigns of the Army of the Potomac and for a time was Medical Inspector of the Sixth Corps.

At the close of the war he resumed the general practice of medicine in Albany, New York, and in 1870 was appointed Professor of Physiology and Diseases of the Eye in the Albany Medical College, the Medical Department of Union University. In 1877 he was given the honorary degree of Doctor of Philosophy by Union.

Being desirous of confining his work solely to ophthalmology, he removed to New York City in 1880. He continued in active practice up to the time of his last illness, about two years before his death, and retained his steadiness of hand and ability to perform delicate eye surgery into his eighty-sixth year.

His published works include: "Three Years in the Sixth Corps," 1866; "Flora of the Adirondacks," 1868; "Les Maladies des Centres Nerveux," 1883; "Functional Nervous Diseases," 1884; "Coaching thru North Wales," 1895; "Les Muscles Moteurs de l'Oeil et l'Expression du Visage," 1892; "A Treatise on the Motor Apparatus of the Eyes," 1905; "An Illustrated Guide to Flowering Plants," 1910; "A Series of Studies of Nervous Affections," 1911; as well as numerous articles on ophthalmologic and general science topics.

In 1883 he received the highest award in a competition instituted by the Royal Academy of Medicine of Belgium for an essay on "Functional Nervous Diseases."

He was five feet and five inches in height and weighed about one hundred and thirty-five pounds. He wore a

mustache. His complexion was florid, his eyes dark blue and his hair dark brown.

He was a lover of good books and had a large general library. He was also an ardent student not only of all branches of his profession, but also of natural history in all its forms. His principal recreation was the study of botany. His extensive herbarium included plants and flowers from all parts of America and Europe. His Guide to Flowering Plants, mentioned above, was published in his eightieth year. It was illustrated with hundreds of drawings made by him from nature.

His attitude toward his professional brothers was an extremely friendly one as evidenced by a host of warm professional friends from all parts of the world. He was very fond of children and also of animals.

In politics he was a republican and was always interested in current events. He was a member of the Congregational Church.

Dr. Stevens's principal contribution to medical science has been his investigations and writings with reference to the anomalies of the ocular muscles. The terminology which he introduced has been universally accepted, and his instruments for determining anomalous muscular conditions are standard and distinctly original.

A list of these terms and instruments is herewith appended.

TERMS RELATING TO CONDITIONS OF OCULAR ADJUSTMENTS.

This system of terms was formally approved and adopted by the American Medical Association and is in general use in America and Europe.

Orthophoria (*o^rphoo^ree^a*, right; *q^op^a*, a tending).—A tending of the visual lines in parallelism.

Heterophoria (*erēpōor*, different).—A tending of the visual lines in some other way than in parallelism, but notwithstanding which, parallelism is habitually maintained by muscular effort.

Esophoria.—A tending of the visual lines toward each other, the tending being restrained so as to permit habitual binocular vision.

Exophoria.—A tending of the visual lines outward, a restraining influence being exerted to maintain parallelism.

Hyperphoria.—A tending of one visual line to rise above its fellow, a tending habitually restrained by muscular action. The term is usually preceded by the word *right or left*, indicating which visual line tends above.

Heterotropia (*τροπη*, a turning).—A generic term indicating a deviation of the visual lines from parallelism. A condition of strabismus.

Esotropia.—The deviation of the visual lines inward. Converging strabismus.

Exotropia.—The deviation of the visual lines outward. Diverging strabismus.

Hypertropia.—The deviation of one visual line above the other. Vertical strabismus.

Anophoria.—The tending of both visual lines toward a plane above the horizon when the head is in what is known as "the primary position."

Katophoria.—A tending of both visual lines toward a plane below the horizon, the head being in the primary position.

Declination.—A leaning of the vertical meridian of the eye to the right or to the left of a true vertical position.

INSTRUMENTS DEVISED BY DR. STEVENS.

These instruments have been widely used and have not been superceded for the purposes for which they were devised.

Phorometer.—An instrument for determining the relations of the visual lines to each other.

Tropometer.—An instrument for determining the rotations of the eyes.

Clinoscope.—An instrument for determining the directions of the meridians of the eye.

In addition Dr. Stevens devised a complete set of surgical instruments for the performance of surgical operations on the external muscles of the eyes.

CHARLES W. STEVENS.

ABSTRACTS

Mazzei. Relations Between Intraocular Tension and Arterial, Venous and Intrathoracic Pressure. Arch. di Ottal., v. 27, p. 83.

By a special recording device, the author was able to record the intraocular tension simultaneously either with the carotid blood pressure, the jugular blood pressure or the endothoracic air pressure. The marked rise of arterial pressure produced by adrenalin and also the marked fall in pressure produced by sodium nitrit were reflected by a similar rise and fall in the intraocular tension.

Smaller changes in the arterial pressure, however, due to struggling or quickened action of the heart were not reflected in the intraocular tension. Changes in the jugular pressure produced by struggling were always accompanied by a similar rise in intraocular tension. This was true of changes in thoracic pressure, probably due to the effect of positive or negative pressure in the chest on the large veins in the neck.

The author also found that tying off both superficial jugular veins raised the intraocular tension two to three millimeters; and tying off both superficial and one deep jugular raised the intraocular tension five millimeters. Tying off one deep carotid artery lowered the tension about three millimeters.

The author concludes that there is a definite relation between the blood vascular system and the intraocular fluids, which is shown especially by the relation between venous pressure and intraocular tension. This intimate relation he believes is due to the effect of venous congestion in filling the venae vorticoseae with blood and hence raising the tension. The practical deduction from this is that in treating high intraocular tension all obstacles to the venous circulation must be removed and anything which increases intrathoracic pressure must be avoided. The literature is discussed and a bibliography of sixteen titles is appended.

S. R. G.

Junius. Hereditary and Acquired Myopia, Zeitschr. f. Aug. XLIV, 5-6.

The questions of the causes, and of what is short-sightedness, are taken up by this author in an essay of 40 pages, with an extensive bibliography. Neither the theory that myopia is caused by lessened nourishment of the tissues; nor the explanation of Stilling, that it is developed by the pull of the external muscles in different forms of the orbit; nor the theory of Steiger, that short-sightedness is a personal acquirement due to inheritance, are fully acceptable.

Short-sightedness is not a personal characteristic, but is a development from forbears. All of these theories have some points worthy of consideration. The latest anatomic studies show that preexisting structural changes must occur for myopia to be developed, which give cause to secondary elongation of the eyeball. The development of the eye has not explained the myopic process. Short-sighted eyes generally show some of the following signs and conditions:

1. Early loss of sensitiveness for light, with slow adaptation and with hemeralopia in a portion of the cases. The development of hemeralopia in myopia is probably due to the disintegrating effect of ultraviolet light rays, where the lens allows these rays to penetrate. It is not, however, generally considered as a cause. In general, there may be a coincident dislocation of the lens and anomalies of the retina, developmental signs connected with hemeralopia, but the acquired weakness of the structures only exists in the high grades.

2. The thinning of the otherwise well developed sclera, which occurs only at the posterior pole, may be observed in the lowest grades of myopia. Steiger states that myopic refraction can arise from misplaced axes with unsuited corneae, which are refractory to the normal development of the ocular structures. By struggle of the growing eye the final shape and its functional capacity are developed. We must agree with Roux that the thinning and lessened resistance of the sclera in the

posterior pole allows of the optic axis becoming longer and is the first noticeable acquired change in the eye.

3. Hereditary and developmental changes are always combined in myopia. The development of ectasia is in the postretinal layers in the epithelial buds, and the anatomic deviation proceeds to the pars ciliaris retinae. No final explanations have been given as to the cause of conus and staphyloma and of the retinal detachment, which is of much importance in the question of myopia.

Many think that short-sightedness is caused by a tendency toward it in the growth of the eye, which is not directly, congenitally abnormal (Steiger), but is in a general sense an acquired anomaly. Myopia may become worse in each individual. The congenital tendency and acquired changes are often inseparable in any case of myopia. Many socalled malignant forms of myopia in young people may be so explained, in that strong tendencies to changes in form are to be observed and perhaps there are also unseen tissue changes in the structure. It is considered that the individual with short-sightedness is disposed towards it by descent. Steiger was not cognizant of the newer biology, as he wrote in 1913. The germ cell has a certain sensitive period in which it responds to influences from its forbears, and thus direct inheritance of myopia from the parents is not impossible. We draw the boundary line between the developmental period and the time in which changes may be acquired, at the end of fetal life, the moment of birth making a sharp line of demarcation (Roux).

5. All variations of the developmental momentum, whether positive or negative, are factors in the myopic process. Light causes physical and chemical irritation to the retina, affects its growth and functions. In the production of myopia the light rays of the spectrum are of first importance. Ultraviolet light has little to do with myopia, but much with hemeralopia. The noteworthy cases of the hemeralopic

short-sighted family, described by Pflueger, give a place to the supposition that ultraviolet light affects the dark apparatus (Parinaud, v. Kries), i.e., the rods and their accessories by electric damage; while the light rays affect the light apparatus, i. e., the cones. The retina is sensitized by light which, from our knowledge of the life of cells, affects the proteins, the colloid substances and their functions, and also sensitize the salts which are held in solution in their substances. Physiology has shown that there is a damaging electric effect upon the cells. The pre-eminence of the foregoing factors needs further proof, especially the effect of light upon the lens and retina.

H. V. W.

Wertheim Salomonson, J. K. A. Bi-nasal Hemianopsia. Tydschr. v. Ge-neesk, Dec. 6, 1919.

At a meeting of the Amsterdam Neurologic Society Prof. Salomonson presented a man, 59 years old, with complaints of poor vision and bad hearing. He had fallen in 1895 in the hold of a ship, bled from nose, mouth and ears and remained unconscious for some time. He suffered permanent impairment of hearing of the right ear, and divergent strabismus. The double image disappeared; the hearing became worse. During 13 years he did light work. During the last 18 months his vision diminished gradually, without apparent cause. A cloud was before his eyes, which existed chiefly in the middle of the visual field. He can now see from the side, not straight ahead. A few months ago headaches appeared at irregular times, and without apparent cause. No hereditary predisposition and no scars were found. L. remains in abduction; its palpebral fissure is narrowed. Only slight abduction and motion downward with marked rotation is possible. The entire oculomotor nerve is paralyzed. The left facial nerve is slightly paretic. Vision has slightly diminished. A distinct binasal hemianopsia is present, which leaves for R. the fixation point free, while in L. the fixation point is in the defect and only eccentric fixation

is possible. Hearing at the left is lost, at the right diminished; the left vestibular nerve is insensible for caloric stimuli. After turning and caloric stimulation some nystagmus is produced from the right vestibule. Deep reflexes in the legs are very weak or absent; knee jerks very weak. At present only 26 cases of binasal hemianopsia have been described. K. H. Bouman could demonstrate in 1909 in a patient of Straub's clinic that the binasal hemianopsia was produced by pressure from above and behind the chiasm, which damaged both the uncrossed bundles the most. This happens because the uncrossed bundles pass at the outer side of the chiasm, but enclosed in the other fibers, and only come more at the surface at the posterior part of the chiasm. In this case a marked narrowing of the temporal side of the visual field was at the same time present. This explanation also holds good for the cases of cerebral tumor and even more for hypophysis tumor. It is difficult to explain thus the traumatic cases (Tuffier, Friedenberg) the cases conformable with that of Struempell, where an isolated neuritis was found, restricted to the direct fibers; the true luetic cases (Galezowski) and the cases where the symptoms of tabes dorsalis are found (Roenne, Price and Head). The possibility of direct side pressure thru arteriosclerosis on the outer sides of the chiasm must be thought of (Knapp).

As the binasal hemianopsia appeared since the last 18 months the old basic fracture, which destroyed the left eighth nerve and facial, cannot be the cause. Roentgenography shows a large sella turcica, but there do not exist typical symptoms of a hypophysis tumor; and W. S. has seen repeatedly cases where the hypophysis was undoubtedly normal and the sella turcica of about the same size. The thinning of the bone, which is present with pathologic enlargement, here is absent. A frontal roentgenograph shows distinct important changes, namely a distinct general darkening directly at the left, beside the sella. It is impossible to make out the cause of this shadow.

Wertheim Salomonson hesitates to diagnose tabes. The absence of the Achilles reflexes and the weak knee jerks are repeatedly found with other persons and belong to the not rare cases of old age neuritis and some cases of medullary arteriosclerosis. Arteriosclerosis is present in a not insignificant degree, so that the possibility of a bilateral carotid sclerosis with eventual aneurysmal dilatation is possible; but it is not proven.

It is impossible to make a certain diagnosis. Important are 1, the previous trauma, which could be the cause for a tumor or aneurysm; 2, the X-ray findings, which point with certainty to a probable tumor or skull deformation in the neighborhood of the sella turcica; 3, the binasal hemianopsia without temporal narrowing. This points rather at double-sided pressure on the chiasm.

E. E. B.

Magitot. Traumatic Myopia. Ann. d'Ocul. v. 157, 1920, p. 680-692.

1. Low degree of myopia, of short duration, disappearing without treatment. There was a hypotension which disappeared with the decrease in the spasm of accommodation. The pupil, at first normal, after 3 days showed a slight spasm, which lasted 25 days.

2. A case of ocular contusion with slight hyphema. Irregular pupil and decreased tension. A myopia of 2 D, decreasing to 1 D in 9 days, finally spontaneously disappearing, with increase and decrease of amount at various times.

3. Contusion of the eye with decrease of tension and spasm of accommodation causing an apparent myopia. This would disappear when atropin was used, to reappear on stopping the atropin. Inequality of the pupil. Finally disappearance of the myopia, but persistence of slight decrease in size of pupil on affected side.

4. Ocular contusion with slight hyphema and ophthalmolacia. Spasm of accommodation with no tendency to remission and very resistant to atropin, unaffected by general anesthesia or paracentesis.

C. L.

Nakamura, B. Change of Color of the Human Fundus in Progressive Dark Adaptation. Klin. M. f. Augenh. v. 65, 1920, p. 83.

In 1907 Oguchi described in a patient with stationary hemeralopia a whitish back-ground with very marked reflexes and much darker retinal vessels. Several such cases of Oguchi's disease of undoubtedly family occurrence in Japan have been published. Nakamura observed with Mizuo in a patient affected with this disease that the peculiar ophthalmoscopic condition entirely disappeared after closure of the eye for hours with exclusion of all light, and a simultaneous improvement of the light sense.

He constructed an adaptometer with which he studied the exact progress of dark adaptation. This remained at first stationary, but after from $1\frac{1}{2}$ to $2\frac{1}{2}$ hours suddenly progressed. The subsequent ophthalmoscopic examination showed the background normal which during the stationary period had a peculiar appearance. After 9 hours dark adaptation the relative light sensibility was 204,000 with normal fundus. Then a subcutaneous injection of 1 c cm. adrenalin 1:1000 was made. An hour later the light sensibility fell to 11,000 and the fundus appeared slightly yellowish with dark vessels. After repeated dark adaptation, for three years the former normal state was restored. The phenomenon seemed to have a certain relation to the change of color of the retina of a dark adapted frog after injection of adrenalin.

C. Z.

Kubik, J. Cysts of the Lacrimal Sac. Klin. M. f. Augenh. v. 64, March-April, 1920, p. 264.

K. observed in a girl, aged 21, who complained of lacrimation of the left eye, a small bluish tumor at the region of the tear sac, which could not be evacuated by pressure while the tear sac could be irrigated. At the operation, according to Toti, a cyst, filled with serum, was found at the anterior wall of the tear sac, and extirpated. K. discusses the literature on the origin of cysts of the lacrimal region and concludes with the assumption, that they, on the one hand, originate in the glands of the wall of the

tear sac and the diverticules formed by inflammatory process (Lurie), on the other hand, that various anomalies in the structure of the lacrimal sac as remnants of embryologic conditions of development are responsible for their formation.

Bailliart, P. Knowledge Concerning Retinal Arterial Pressure. *Ann. d'Ocul.* v. 157, 1920, p. 308.

The author reviews the objections which his previous papers had evoked and claims they are not well grounded. The apparatus used is sufficiently exact and the technic is not as difficult as claimed. Direct ophthalmoscopy is to be preferred to indirect, as the latter does not give sufficient magnification. The apparatus should be applied directly to the conjunctiva, after the use of holocain. Homatropin should not be used except in myosis or lesions of the media. The author has worked out a table which gives the correspondence between the initial tension most frequently found and the dynamometric pressure, but even this is not exact. Measurements made on the eye of the cat are not exact for the human eye, but they are close enough. Objections to the views and results of several authors are given. In conclusion, he states that while ocular tension is not influenced by retinal arterial pressure, there is a parallelism between the two within certain limits, and quotes the findings of Velter as proof. C. L.

Giraud, P. Transitory Amaurosis with a Small Yellow Spot Above the Macula Following the Ingestion of Quinin. *Clinique Ophthalmologique*, v. 25, 1921, p. 237.

The author reports the case of a young woman who took 6 grams of quinin with criminal intent. Its use was followed by vomiting, anuria and contraction of the field of vision. The optic nerves were blanched and the retinal vessels greatly contracted with an associated periarteritis.

The unusual feature was the yellow spot a little above the macula. He calls attention to the observation of Zanotti who noted disseminated white spots along the retinal arteries. Zanotti explains the existence of these spots as a degeneration of the retina due to the ischemia.

T. J. D.

Addario, La Ferla. Retinitis Proliferans Due to Trauma. *Arch. di Ottal.* v. 27, p. 105.

The author had the opportunity of observing a typical case immediately after the trauma and two years later. The case was in a young soldier who, after the explosion of a hand grenade in his vicinity, had noticed disturbances of vision and that objects seemed red. At this time, both eyes showed hemorrhages in the retina and vitreous so extensive that in the right eye, the fundus could not be seen. On diaphoretic treatment, darkened room and subconjunctival injections of adrenalin, vision improved to one half in both eyes, when the patient was dismissed. On his return two years later, the typical changes of retinitis proliferans were seen. Numerous white bands extended from the retina near the disc to other points toward the periphery of the retina. Most of these were on the surface of the retina, passing in front of the retinal vessels. Some ended by a club shaped enlargement which floated freely in the vitreous. Others spread out into a thin membrane in the periphery of the retina. His fields were markedly cut down in both eyes. In this case, lues, nephritis, diabetes, hemophilia and malaria could all be excluded as causes, the traumatism being the only possible cause. After a review of the literature, the author believes that intraocular hemorrhage, usually from trauma is probably always necessary to the production of the fibrinous bands which make up the picture of retinitis proliferans.

S. R. G.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS.

Daniel E. Esterly, Topeka, Kansas, aged fifty-four, died May eighth.

Charles C. Stuart of Cleveland died April 11th, aged fifty-four. He was ophthalmologist to German, City, and Charity hospitals.

Charles H. McIlwaine, Newark, New Jersey, aged seventy-seven, founder and for ten years director of the Trenton Eye and Ear Infirmary, died April twenty-first from uremia.

Ernest Schalck, Brooklyn, aged sixty-one, died April fifteenth from heart disease. He was ophthalmologist to Wychoff Heights Hospital and Bethany Deaconess Home and Hospital; surgeon to Knapp Memorial Hospital.

Henry E. Juler, F.R.C.S., Moorfields' Eye Hospital, London, died at his home, 17 Alexander Court, Queen's Gate, London, April twenty-third, at the age of seventy-nine. He was for many years ophthalmic surgeon, Royal Westminster Hospital, St. Mary's Hospital and clinical assistant Royal London Ophthalmic Hospital, Moorfields.

PERSONALS.

Dr. Alfred Murray of Chicago has been appointed Rhinologist and Laryngologist to the Augustana Hospital.

Dr. Isaac Hartshorne announces the removal of his office to 30 West 59th St., New York City.

Dr. Pacheco Luna of Guatemala, and Dr. A. S. Green, of San Francisco have been visiting the various clinics in France, Spain and Vienna.

Dr. Edward Jackson of Denver attended the meeting of the Iowa State Medical Society, and addressed the Society on the topic "Diseases of the Blood Vessels as seen in the Eye."

Dr. William M. Gordon Byers has been chosen Surgeon-in-Charge of the Ophthalmic Department of the Royal Victoria Hospitals and Clinical Professor of Ophthalmology in McGill University, Montreal, Canada.

Dr. Edward Jackson and Dr. William C. Finnoff, of Denver, have gone east to attend the meeting of the Section on Ophthalmology of the American Medical Association and the American Ophthalmological Society.

NEWS ITEMS

Dr. George F. Keiper of La Fayette, Indiana, has been elected president of the new Indiana Hospital Association, formed April 27th at La Fayette. The association is auxiliary to the American Hospital Association.

Dr. Frederick W. Lamb, of Cincinnati, announces that after twenty years' association, his partnership with Dr. Derrick T. Vail has been dissolved, and that he has opened offices in the Provident Bank Building, at Seventh and Vine Streets, Cincinnati, Ohio.

Dr. George E. de Schweinitz has been chosen President elect of the American Medical Association. No candidate appeared against him when the elections came up in the House of Delegates. The next meeting of the Association will be held in St. Louis.

Dr. James A. Spalding, a veteran ophthalmologist of Portland, Me., has recently had the misfortune to lose his aged wife. The affection seems to have been a tumor of the pituitary body. The ophthalmologic profession extend their sincerest sympathy to Dr. Spalding at this time.

Col. Henry Smith, I.M.S., Punjab, India, addressed the Cincinnati Academy, May 9th; the Texas State Society, at Dallas, May 12th, where he held a clinic May 13th on Intracapsular Extraction. The Illinois Medical Society, May 16th, and the Pittsburgh Medical Society, May 23rd. He will attend the session of the American Medical Association, Boston, and the American Ophthalmological Society, at Swampscoot, June 15th.

SOCIETIES.

At the regular meeting of the Chicago Ophthalmological Society May 26th, a dinner preceding the meeting was given in honor of Lt.-Col. Henry Smith. On the same afternoon Col. Smith conducted a surgical clinic at the Illinois Charitable Eye and Ear Infirmary.

Dr. C. R. Dufour, of Washington, D. C., read a paper on "The Consideration of Certain Eye Diseases with which the General Practitioner should be Acquainted," before the regular meeting of the Warren, Page, Rappahannock Medical Society, Front Royal, Virginia, April 12, 1921.

At the May 16th meeting of the Section on Ophthalmology of the New York Academy of Medicine the essayists, by invitation, were Lt.-Col. Henry Smith and Dr. Harry Vanderbilt Würdemann. The paper of Col. Smith was upon "Some Ophthalmic Conditions," which embraced a short note on microphthalmos and congenital cataract, the control of the eyelids in cataract operations, and how to deal with a drawn up pupil. Dr. Würdemann presented a paper on "The Mechanism and Effect of Massage of the Eyeball as Applied in Iritis, Synechia, Glaucoma, Embolism of the Central Artery, Optic Nerve Atrophy and Retinitis Pigmentosa.

The American Ophthalmological Society held its meeting at Swampscott, June 14th and 15th with nearly one hundred members present and a large number of visitors. The limit for membership was raised from two hundred to two hundred and twenty-five. The following were elected associates and upon attendance of the required number of meetings will become full members of the Society: William L. Benedict, Rochester, Minn.; Nelson Miles Black, Milwaukee, Wisconsin; E. E. Holt, Jr., Portland, Me. The next meeting of the Society will be held in Washington, D. C., in association with the Triennial Congress of American Physicians and Surgeons.

MISCELLANEOUS.

During his visit to Dallas, Texas, Lt.-Col. Henry Smith, of India, was presented with a handsome gold watch and chain by Dr. J. O. McReynolds.

Thru the efforts of Mrs. Beatrice Duncomb, of London, president of the Guild of Blind Gardners, it is hoped to secure a piece of land near London on which to establish a training center for the blind to obtain a useful occupation.

Oklahoma has passed laws creating separate boards for chiropractors and osteopaths, which allows them to administer any drugs taught in their schools and requires the instillation of one per cent silver solution in the eyes of new-born infants. Such laws give these cults a great boost at the expense of the public. We wonder how long the public will stand for it.

Several cases of ophthalmia neonatorum treated by Chicago physicians, which terminated in blindness, were investigated by the Illinois Society for the Prevention of Blindness and it was learned that in six cases the physicians failed to observe the requirements of the State law governing the report of physicians. This law requires a report within six hours of any inflammation in the eyes of an infant under two weeks, irrespective of the nature of the infection.



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3

SIDEROSIS OF THE CRYSTALLINE LENS, (VAN DUYSE AND DANIS)

1. RING OF YELLOWISH BROWN SPECKS WITH FINER SCATTERED ONES, MOSTLY SITUATED BENEATH THE ANTERIOR CAPSULE OF THE LENS.
2. THE DARKER SPOTS, A AND B, IN UPPER RIGHT QUADRANT OF FIG. 1 ARE MORE HIGHLY MAGNIFIED. THEY ARE SITUATED IN FRONT OF THE LENS CAPSULE.
3. MICROGRAPH WITH DARKLY SPECKLED LOWER RIGHT QUADRANT OF FIG. 1, BETWEEN RING OF LIGHTER

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TYPICAL SIDEROSIS OF CRYSTALLINE LENS. NO CLINICAL EVIDENCE OF A SPLINTER OF IRON.

PROFESSOR DANIEL VAN DUYSE, GAND.

AND

DR. MARCEL DANIS, BRUXELLES.

In the case here reported, a slight injury was followed after two years by evidences of siderosis and cataract. No scar of entrance and no foreign body could be discovered. But careful investigation seemed to show that a small splinter of iron had been retained in or near the crystalline lens. A definite discrimination is made between the rust spots underneath the anterior capsule and pigment spots upon its external surface.

The case here outlined was made the object of medicolegal investigation. The facts shown are of interest in practice.

CASE. M. A man of 45 years was wounded Nov., 1917, by a fragment of a casting thrown off in cutting a pipe. A certificate given at the time mentioned a contusion with wound of the right eye; but nothing more. Two years later one finds that the injured eye cannot see, that the crystalline lens is opaque with little brownish points on its surface arranged in a circle.

January, 1920, it is noted R. vision =fingers at 1.5 meters, hyperemic. The two irides have the same color; the right pupil dilates regularly with homatropin. Nine rust colored spots with diffused margins, partly concealed by the edge of the iris, are shown in the diffusely opaque crystalline.

Two competent colleagues who examined the patient determined that the visual field is a little less than normal, that the deep membranes have not been affected and they noted an ocular tension of 30 mm. of mercury of the injured eye with intermittent orbital pain. The left eye had a tension of 18 mm. of mercury. They thought that a fragment of iron was dissolved in the anterior layers of the crystalline lens, that the iris was not discolored and that the vision was progressively changing.

In March 1920 the radiographic examination gave a negative result. Ex-

amination with the galvanometer practiced in May, 1920, was equally negative and the same was true of the examination with the giant electromagnet made in July, 1920.

1920, July 17. The left eye of M. (V.=0.9 with -1.50 D.) is normal. Its iris is in all respects similar to that of the wounded eye.

In the right eye light projected from the plane mirror is clearly and rapidly perceived in all directions. (Visual field without appreciable impairment. Integrity of the deep membranes.) As in former investigations no scar over the cornea is perceived, even when examined with the corneal microscope. There is no hyperemia of the eye, nor neuralgic pain. The tension is 18 mm. of mercury, the reaction of the pupil prompt, the anterior chamber diminished in depth.

By daylight the opaque crystalline lens, after dilatation by homatropin, is greenish-yellow. In both eyes one notices a relative hypoplasia of the lower segments of iris stroma, a species of broad incomplete coloboma, without any relation to the accident of 1917. The color of this segment is grayish and it is less pigmented than the remainder of the iris. On these are two spots (rust colored spots of the iris) having a russet brown color and caused by pigmentation of the anterior, vascular connective layer. Their particular character, the fact that they are bilateral in our patient shows they

have nothing in common with siderosis.

A second examination made August 7th, by means of the corneal microscope with the slit lamp illumination of Gullstrand, afforded the following notes:

Siderosis Spots. There exist at the level of the anterior surface of the crystalline a wreath of nine ocherous centers of a yellow brown with diffused borders consisting of a collection of dust in granules of a dark brown, more or less massed toward each other. Between these foci, especially below at the temporal side, are distributed fine spots of russet or gray brought out by the incidence of the light. They occupy also the central portion of the pupillary area of the crystalline. Between the peripheral ocherous foci is presented an appearance similar to that of the central area. Some spots are elongated toward the equator of the eye and partly covered by the pupillary margin of the iris. (See Color plate VIII, Fig. 1).

All of these spots, both large and small, are seated in the peripheral cortex of the crystalline lens under the anterior capsule, and they correspond to a more or less symmetric distribution of dust of the oxid of iron.

Pigment Spots. The small pigment corpuscles scattered in small numbers on the anterior capsule are clearly distinguished from the preceding by their localization in a more anterior plane and their darker color. With the low power of objective 55, one observes as A and B, Fig. 1, two dark granules. Under greater magnification, objective A-3, ocular 6, B takes more rounded form with a slightly roughened surface and a brownish tint, and joins a plaque of siderosis which is subcapsular and of yellowish tint. (Fig. 2.)

The other granule A takes an irregular form and a color similar to the first, with a dark brown nucleus. Some smaller epicapsular granules are found below and to the nasal side. (Fig. 2, Pl. VIII.)

A third corpuscle C takes, under the same enlargement, a triangular form with irregular outline. It has the same color as A and B, and is surrounded by

little brownish granules. (Fig. 3, Pl. VIII.)

These pigment spots do not have their origin in siderosis. One can formulate the hypotheses of pigment proceeding from a pigmented pupillary membrane, from blood pigment or from uveal pigment.

Cataract. This is undergoing maturation of which the evidence is swelling of the crystalline, reduction of the anterior chamber, and the brilliance of the sectors having the appearance of asbestos, principally arranged between the ocherous foci of the wreath. In the center of the crystalline we find a large dull gray flake. The temporary increase of tension and hyperemia of the iris occurring some weeks before may be the effects of the initial swelling, rather rapid, of the cataract due to siderosis. At the beginning it seems to have had the nature of cyclitis. One finds in any case a traumatic cataract by penetration of a foreign body which has not been accompanied by posterior synechia; something exceptional, according to Praun.

Pathogenesis of the Epicapsular Pigment Deposits. We can here in the absence of anatomic and histochemical examinations only formulate an hypothesis.

We are not unwilling to entertain the idea of remains of congenital pigmentation. They may assume the form of points,* filaments or membranes, the latter being more rare. Neither membranes nor filaments are visible here between the epicapsular deposits and the pupillary margin. Krückmann admits that the remains of pupillary membranes may consist of fixed points on the anterior capsule. If one raises the question of a uveal origin the location of the deposits excludes broken iritic synechiae. The illumination of Gullstrand of pigment cells here shows them more black, more like China ink. A cyclitis, if it existed, could cause migration of the uveal pigment and its precipitation on the anterior

*We remember that the late pigmentation of the tissue of persistent pupillary membrane is described in the same language as that of the iris stroma. Compare these punctate deposits and brown precipitates on the anterior capsule with two filaments of pupillary membrane represented by Peters (Fig. 15).

capsule by intermediation of leucocytes brought to the anterior chamber. On the other hand ocular contusion apart from inflammation may disturb the pigment of the iris, which fixed in tissue albumin may be deposited on the anterior capsule.

A traumatic hemorrhage might leave remnants of the blood fixed by the agglutination of the blood albumin. Thus Vogt and Schurmann have stated that pigment corpuscles similar to those under consideration and studied by the Gullstrand illumination, are found in the temporary epicapsular ring of Vossius. (precipitated hematic dust). Vogt described them as clotted, angular, ranging from dark yellowish red to brownish red, scattered and of irregular size and form. It is believed they should not be confused with the congenital pigment which is found on almost all anterior capsules, pigment assuming stellate form or having a rounded contour.

Spots of Subcapsular Siderosis. These spots are pathognomonic and well known. These ocherous foci actually exist and constitute a step towards the star like figure drawn by Hertel. The first parts of the star are placed within the pupillary area and extend later in rays from the center to the equator.

We have not found a corneal cicatrix. It is probable that the penetration of a splinter of iron was effected obliquely thru the limbus at the periphery of the iris, toward the equator of the crystalline lens in which it is fixed. We know that a small wound of the limbus is no longer visible after 24 hours. The point of penetration in the periphery of the iris is such as to escape attention after the accident; and was promptly concealed. In view of the integrity of retinal projection the intracrystalline seat of the metallic fragment is probable. One cannot, however, absolutely exclude a paracrystalline situation.

It is well known that after a long delay the crystalline lens containing a foreign body becomes completely clouded; the localized opacity slowly progressive for months or years. This is the case with a small metallic body superficially situated in the periphery of the crystal-

line under the capsule (Wagenmann), an important point in the estimation of damages in cases of insurance.

In this case the crystalline was swollen for months after the wound causing a hyperemia and temporary increase of tension which no longer continues.

The ring of russet spots is not produced as in the case of exogenous deposit, where in many observations they correspond to the margin of the pupil. These spots extend also toward the equatorial zone.

Sattler claims that with a sufficient absorption of oxygen the iron is transformed directly into an oxid, and von Hippel that it is spread by diffusion in a soluble form (oxydized carbonat and albuminat of iron). In the presence of certain organic substances, such as the globulin of the crystalline, it is not precipitated. A ferric combination arises, soluble and apt to be diffused. A portion of the oxid of iron so diffused contracts relations with insoluble albuminoid substances, causes a kind of tannin which explains the cohesion of exogenous cataracts and the necessity for making a large corneal section for their extraction. This opinion of Sattler has been combatted by Elschnig. A ring of brown discrete pigmentation has been seen on the intact posterior capsule which is not covered with epithelium (Hertel).

The same wreath or ring can be produced without wound of the crystalline; the magnetic foreign bodies found in the neighborhood of the crystalline or in the posterior segment of the eye, the crystalline remaining transparent or not (Wagenmann).

Vossius admits that when there exist single rust spots only on the crystalline without lesion of the iris the foreign body is situated in the lens. When there exists simultaneously siderosis of the crystalline and of the iris the situation of the foreign body is in the vitreous or retina. The case of Westphal studied by Landmann closely resembles ours: Wound by fragment of iron February, 1879, lodged in the crystalline or its immediate vicinity; progressive disturbance of vision and inflammation in July, which receded without synechiae. The

crystalline became opaque and a wreath of rust spots appeared in the periphery of the cortex under the capsule. After discussion in October, 1880, a small fragment became visible (1 mm. x $\frac{1}{4}$ mm. x $\frac{1}{3}$ mm.) lodged behind the posterior capsule.

Eisenberg studied fourteen cases of ocular siderosis with the seat of the fragment almost exclusively in the vitreous. The crystalline became clouded early by reason of the injury in five cases, and late in 8 cases by the action of the iron; and in the greater part with points of brown under the capsule. The distribution of the rust following figures which eventually became stellate suggests these reflections.

Samelsohn, who studied in 1881 the channels of the lymph of the crystalline, found the brown color appeared always at the equator (?) the regular disposition of the spots of that color suggests a true interstitial circulation in the crystalline lens. The rust has a tendency to slip under the anterior capsule toward the periphery of the organ, under the form of scattered particles which reunite in a first central ring. These extend as rays and in concentric progress towards the equator until the fine particles unite in an external ring, at the position where they seem to be retained. A moving liquid carries the granules of iron to the place under the capsule which corresponds to the greater circle of the iris, at the termination of the zonular fibres of the anterior capsule; the hypothetic moving liquid is directed toward the point of attachment of the zonular fibres to leave the lens and penetrate into the anterior chamber. The fine particles of rust then accumulate at the mouths of the pores thru which only the fluid is able to pass. But for splinters of iron in the vitreous the same accumulations of rust are observed under the anterior capsule. There particles have therefore passed into the crystalline. They not only form heaps of true granules but the granules are contained in proliferated cells of the capsular epithelium. (Leber.).

According to Leber there are neither currents nor pores in the capsule of the crystalline. The transfer which we have

in mind is made by diffusion of the solution of iron that can pass thru the intact epithelium, so that the rust points can be grouped in parts removed from the foreign body. Part of the fragment of iron is dissolved by the carbonic acid of the ocular fluids and combines with the diffusible oxid of iron. This combination distributed in the eye is then transformed by oxygen absorbed in the ocular fluids into an insoluble combination, which may be deposited far from the fragment. As von Hippel has established, an important role is here played by the cells and certain tissue elements in which the iron, probably dissolved under the form of an albuminat, is kept in order to pass to the insoluble combination which accumulates in abundant quantity. The reason for the disposition of the spots in the foci of rust at the circle of the pupillary margin beneath the capsule has not been elucidated.

We dwell a moment on the negative results of the means employed to demonstrate in the eye metallic fragments. Why are they still ineffective? If one admits with us the penetration of the corneal limbus by a very small fragment of iron, that it traverses obliquely the iris near its periphery and is arrested in the crystalline (the probable thing) or in the immediate vicinity behind it, the reasons for the negative results of examinations for its detection are readily perceived.

In March, 1920, a radiographic examination was negative (Dr. Murdoch); repeated later it was still negative (Dr. Hauchamps).

The giant electric magnet of Haab applied by us has given no result in July 1920.

The galvanometric examination practiced by Prof. Gallemarts was equally negative.

As to the radiographic examination we know that the X-rays too often give no skiagram for magnetic foreign bodies of small size.

The attraction of the giant magnet could not be effective on a very small particle fixed between the more or less adherent fibres of a maturing cataract.

The galvanometer could not function we are led to believe because at the time it was applied for the examination, the magnetic foreign body had been entirely transformed into a salt of iron, for we have observed the exquisite sensibility of that instrument in numerous cases of fragments within the eye, which weighed less than 1 milligram. This last hypothesis will equally explain the negative results of the other examinations.

Conclusions. A small metallic particle is fixed in the crystalline lens or in the vitreous in close proximity. The cataract may be extracted or allowed to remain in place. Binocular vision is lost and the indemnity should be estimated at 30 per cent.

Eyes of this kind are exposed to late complications; luxation and subluxation of the crystalline, sympathetic irritation, iridocyclitis, glaucoma, etc.

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THE ETIOLOGY OF CHRONIC MEIBOMITIS.

SANFORD R. GIFFORD, M. D.

OMAHA, NEBRASKA.

This paper reports the bacteriologic examination of material obtained from 65 patients. The studies were made in the Departments of Ophthalmology and Bacteriology, University of Nebraska, College of Medicine. The mechanical factors tending to cause an influence to meibomitis are also pointed out, and the literature of the bacteriology of the Meibomian glands is reviewed.

In a previous communication it was found that the chronic affections of the meibomian glands could be conveniently divided into six classes:

1. Simple hypersecretion.
2. Simple chronic meibomitis.
3. Chronic meibomitis with hypertrophy.
4. Chronic meibomitis with chalazia.
5. Chronic meibomitis secondary to various forms of chronic conjunctivitis, especially trachoma.
6. Chronic meibomitis with concretions.

Before considering any specific bacterial origin, other simpler factors must be taken into account. It was noted that most of the cases in classes 1, 2, 3 and 6 occurred chiefly in patients over forty years of age, while those in class 4 were chiefly in young adults. While the number of cases is small, it would seem that the age factor is important in determining the type of condition. One naturally thinks of the increase of connective tissue in old age, and the situation of these glands, each in its nest of interwoven connective tissue bands, makes them especially liable to compression during these sclerotic changes. Some alveoli are likely to be isolated entirely, and it is probably these alveoli in whose inspissated secretion the lime salts are deposited which form the calculi described under class six. Other alveoli are in places simply compressed, their normal emptying is interfered with, and conditions are created most favorable to bacterial growth. The chronic spasm of the orbicularis in presbyopes, with its abnormally severe milking action on the glands, is doubtless another factor. This alone may suffice to produce the conditions described under Class 1, simple hypersecretion.

The other classes, where signs of inflammation are present, are harder to explain as being due to these mechanical factors alone. Hence it seemed worth while to study the bacterial content of the glands both in these conditions and in normal lids. It is difficult to secure material from the glands free from the flora of the sac and lashes. The procedure adopted was to wipe each lid border with a slightly moist sterile sponge, squeeze both lids together and rub the loop along the mouths of the glands, being careful not to touch the cilia. Moist Loeffler's blood serum or cooked meat broth were usually used as media, both of which proved favorable to the growth of the pneumococcus, streptococcus, Morax-Axenfeld bacillus, and bacillus xerosis. Blood agar was used for a few cultures but was not so satisfactory.

It will be seen that in the twenty cases included in Tables I and II, bacillus xerosis was found in smear or culture nine times, a staphylococcus fifteen times. In the five cases of Tables III, B. xerosis was found twice, a staphylococcus four times. These results are somewhat misleading, however, since in considering material obtained from such a region it must be remembered that some of the growth in cultures originates almost certainly in the roots of the lashes, where staphylococci are known to be almost always present. Organisms found in the smears must be considered as more important than those found in the cultures only. And in most of the smears where organisms were found, bacillus xerosis was present in much larger numbers than staphylococci, and was more often the only organism seen.

Of other organisms, in Tables I, leptothrix was found twice (culture in only one), pneumococcus once and bacilli

TABLE I.—SIMPLE MEIBOMITIS

CASE	AGE	SMEAR	CULTURES
1. Mr. S.	42	Staph., Diphtheroid	B. xerosis, S. aureus, S. albus
2. Mr. M.	32	Not recorded	S. albus
3. Mr. F.	60	Leptothrix, Staph.	S. albus, B. xerosis
4. Mr. H.	27	Diphtheroid, Leptothrix (?) Staph..	B. xerosis, Leptothrix, S. albus
5. Mr. W.	67	Negative	S. albus
6. Mr. N.	?	Staph.	S. albus
7. Mr. C.	47	Diphtheroid, Staph.	B. xerosis, S. albus
8. Mr. J.	56	Negative	Staphylococcus
9. Mr. K.	49	Staph. Gramnegative diplo- bacillus	S. albus, Gramnegative bacillus like Morax-Axenfeld bacillus
10. Mrs. F.	63	Gramnegative bacillus, Staph.	Staph.
11. Mr. A.	61	Diphtheroid, few Staph.	B. xerosis, S. aureus
12. Mrs. M.	62	Numerous diphtheroids	Not recorded
13. Mr. B.	33	Negative	Staph., B. xerosis, Pneumococcus (?)
14. Mr. F.	47	Negative	S. albus
15. Mrs. S.	64	Not recorded	B. xerosis
16. Mr. G.	26	Staph.	S. albus
17. Mrs. B.	54	Negative	Negative

TABLE II.—MEIBOMITIS WITH HYPERTROPHY

CASE	AGE	SMEAR	CULTURES
1. Mr. C.	40	Staph.	S. aureus, S. albus.
2. Mr. H.	32	Diphtheroid, Staph.	B. xerosis, S. albus.
3. Mrs. C.	47	Negative	S. aureus

TABLE III.—MEIBOMITIS WITH CHALAZIA

CASE	AGE	SMEAR	CULTURES
1. Baby A	8 mos.	Negative	Fusiform bacillus
2. Mr. A.	35	Negative	Staph.
3. Mr. G.	28	Negative	Staph., Pneumococcus
4. Mr. R.	54	Diphtheroid	B. xerosis, S. albus
5. Miss T.	22	Diphtheroid, Staph.	S. albus, S. citreus

TABLE IV.—NORMAL LIDS—MEDICAL STUDENTS

CASE	AGE	SMEAR	CULTURES
1.	22	Diphtheroid, few Staph.	S. albus
2.	20	Negative	Staph.
3.*	21	Diphtheroid	S. aureus, Bacillus A. 1.
4.	23	Negative	Bacillus A 1.
5.	22	Few Diphtheroids, few Grampositive bacilli	S. albus
6.	21	Negative	Bacillus A 2.
7.	21	Few Staph.	S. albus
8.	25	Negative	B. xerosis
9.	20	Negative	S. albus
10.	23	Negative	B. subtilis
11.	22	Negative	Staph.
12.	23	Negative	Staph.
13.	25	Negative	Staph.
14.*	21	Negative	Staph.
15.	21	Few large Gramnegative bacilli	Negative
16.	23	Negative	Staph.
17.	22	Negative	Staph.
18.	29	Negative	Staph., B. subtilis
19.	20	Negative	S. albus
20.	28	Negative	S. albus

*Indicates cases with slight inflammation of lid borders or excess of fluid from glands.

TABLE V.—NORMAL LIDS—OLD MEN AT COUNTY HOSPITAL

CASE	AGE	SMEAR	CULTURES
1.	52	Negative	<i>S. albus</i> , <i>B. xerosis</i>
2.	46	Negative	<i>S. albus</i> , <i>B. xerosis</i>
3.	68	Large Grampositive spore bearing bacillus	<i>S. albus</i> , <i>B. xerosis</i>
4.*	64	Large Grampositive spore bearing bacillus	<i>B. xerosis</i>
5.	81	Negative	<i>S. albus</i> , <i>Bacillus A 1.</i>
6.	72	Negative	<i>S. albus</i> , <i>B. xerosis</i>
7.	65	Diphtheroid	<i>B. xerosis</i> , <i>S. albus</i>
8.	56	Negative	<i>S. albus</i> , <i>B. xerosis</i>
9.	58	Negative	<i>S. albus</i> , <i>Bacillus A 1.</i>
10.	70	Few diphtheroids	<i>S. albus</i> , Gramnegative bacillus like Morax-Axenfeld bacillus
11.*	58	Negative	<i>S. citreus</i> , <i>Bacillus A 3.</i>
12.	52	Negative	Staph.
13.	63	Negative	Staph., <i>B. xerosis</i>
14.	87	Negative	<i>S. albus</i>
15.	80	Staph.	<i>S. albus</i> , <i>B. xerosis</i>
16.	63	Negative	<i>S. albus</i> , <i>B. xerosis</i>
17.	58	Negative	<i>S. albus</i> , <i>B. xerosis</i>
18.	76	Negative	<i>S. citreus</i> , <i>B. xerosis</i>
19.	76	Negative	<i>S. albus</i> , <i>B. xerosis</i>
20.*	59	Few diphtheroids	<i>B. xerosis</i>

*Indicates Tables IV and V, cases with slight inflammation of lid borders or excess of fluid from glands.

morphologically identical with the Morax-Axenfeld bacillus were found twice. In Table III, pneumococcus was found once and a fusiform bacillus once.

In the normal lids of the younger age group included in Table IV, *B. xerosis* was found three times, a staphylococcus fifteen times, while in the older men, (Table V) *B. xerosis* was found fourteen times and staphylococcus seventeen times. Here cultures must be our chief guide, since few organisms were found in smears. As occasional inhabitants of the glands, it is worth mentioning a group of short, plump, grampositive, motile, sporebearing bacilli which I have not seen described. All were very similar in morphology, being typically short, often almost round, and frequently seen in pairs, but forms swollen at one end and longer forms were not uncommon, while many central spores were seen in older cultures. The typical growth on agar was delicate and transparent with small round colonies. Organisms growing so were found twice in each age group and may be called bacillus A 1. One organism, similar morphologically, but showing a much thicker white growth, is called A 2 and was isolated once; while

another organism isolated once was of much more delicate growth, never becoming perceptibly raised from the surface of the slant, and was less plump in morphology. It is called A 3, tho it may prove to be a type more distinct than A 1 and A 2. In cases of meibomitis, I have never found any organisms of this group, but in one case of severe membranous conjunctivitis, a typical A 1 organism was found with others, in smears and cultures from the membrane.

Besides these organisms, a large grampositive spore bearing bacillus, sometimes forming short chains, was found in smears of two cases in Table V. It resembled a hay bacillus, but since it did not grow in aerobic cultures, is possibly an anaerobe. Occasional similar organisms have been found in smears of a few cases of simple hypersecretion, and the "few large grammegative bacilli" found in case 15, Table IV, were possibly old forms of the same organism.

Bacilli showing the typical clubbed and barred structure after two to three days in culture were called bacillus xerosis. A few strains injected subcutaneously into guinea-pigs produced

only slight local inflammation lasting one to two days, probably a foreign proteid reaction. Fermentation tests were done on only a few strains and these bore out the conviction that I have received from the fermentations of conjunctival strains, that there are several types of diphtheroids to be found in the sac and glands. For convenience, however, the term bacillus xerosis has been retained.

LITERATURE

In my previous communication, several reported cases of severe meibomitis were mentioned in which unusual organisms were found; bacillus mucosus capsulatus and streptothrix.

Reports on the bacteriology of the more usual types, and of the normal Meibomian secretion, however, are very scanty. Kuschbert and Neisser¹ in 1882, in twenty-five cases of associated hemeralopia and xerosis conjunctivae, found masses of slender bacilli in the foamy fatty debris of the sac and considered this organism the cause of the disease. Cultures and animal inoculations were negative.

Reymond and Colomiatti² rightly interpreted this foamy material as accumulations of fatty debris from the meibomian glands, mixed with conjunctival epithelium. They confirmed the presence of similar bacilli in large quantities, but stated that they could also be found almost constantly in normal meibomian secretion. They were also unable to grow them on media or in laboratory animals; but from their description, both of these groups of authors would seem to have been dealing with one of the diphtheroids, like *B. xerosis*. They state that Cervera had found *oidium albicans* in these epithelial plaques, and they found this organism also, tho not constantly.

Since Deyl (Quoted in Hala) in 1893 heralded an organism found in chalazia, as the chalazion bacillus, Hala³ and others have confirmed its presence, and grown it in culture. It is interesting that Hala found the bacilli in twelve cases of acute chalazia (?) less than two weeks old. (In such acute and subacute meibomian nodules, I have only once found what was apparently *B. xerosis*; usually

only *Staph. aureus*.) A discussion of the etiology of chalazia will not be undertaken here, except to state that most observers believe Deyl and Hala's bacillus to be identical with *B. xerosis* and hence of doubtful etiologic significance.

The nodules produced by Deyl by subconjunctival injection of his cultures hardly seem to have been true chalazia. The introduction of organisms into the lumen of the glands by such a method could only occur by rare chance. I have tried to introduce them into the mouths of the ducts by a capillary glass pipette, but without notable success. A few subconjunctival injections of bacillus xerosis have not in my hands produced lesions comparable to chalazia.

H. Gifford⁴, in an article on ocular asepsis, stated that the perfectly normal meibomian secretion had proved sterile in seven out of eight cases, using serum as a medium; but that when waxy casts were expressed, these contained numerous organisms. Aside from this, the observations of Reymond and Colomiatti in smears, above quoted, are the only ones I can find dealing with the bacteriology of normal meibomian secretion obtained by expression. There have been a fair number of reports on the flora of the normal lid borders: Panas⁵, Cuénod⁶, Harman⁷, Fava⁸, Betti⁹ and others. Of these, Panas, Cuénod, Harman and Betti cultured the smooth lid border separately from the lashes, but some of their material undoubtedly had its origin among the lashes, while Fava cultured the lashes only. As would be expected, Panas and Cuénod who used only gelatin, gelose and agar, obtained chiefly staphylococcus albus, less frequently staphylococcus aureus, Cuénod having found *B. xerosis* only once. The others, using serum containing media, found a much greater variety. While Harman found chiefly staphylococcus albus and aureus, one normal case showed numerous colonies of Morax bacilli.

Betti found bacillus xerosis, usually in mixed culture, in 85.4% of cases, pneumococcus in 27%, Morax B. in 7.2%, and bacillus influenzae in 4.1%. Fava, culturing the cilia, did not find *B. xerosis*, but staphylococcus albus was

present in most cases. It is interesting to note, however, that he found four anaerobes, two of which were *B. Welchii*, and two *B. ramosus*, also eight strains of *B. subtilis*, and one nonpathogenic streptococcus. The small diplobacillus found in one case by Cuénod but not isolated, is interesting because of its apparent resemblance to the bacillus A group described in the present work. None of these observers found *B. mucosus capsulatus* on the normal lid border. Von Michel¹⁰ states that *staphylococcus aureus* is usually found in meibomitis, but is apparently including the acute with the chronic forms.

COMMENT

Discussion: A discussion of the pathogenicity of *B. xerosis*, about which so many pros and cons have been written, would hardly be in place here. Its almost universal occurrence in the sac is now well known, as is the fact that it thrives in the presence of pus from any cause. I like to call Bacillus xerosis a "pyophilic" organism to distinguish it from the pyogenic organisms which actually cause pus. Thus we may find it more common in the glands of old people whose secretion is in some way disordered, the cause of its frequency being the same as that of the frequency of meibomitis in old people. It seems worth recording, however, that it is found in larger numbers in the smears of chronic meibomitis, which occurs more often in the laboratory work.

the old, and is found much more frequently in the normal meibomian secretion of old people than in that of younger people.

Thus it seems credible that, as old age advances, and more and more xerosis bacilli find their way into the glands where their growth is favored by the senile changes previously mentioned, collections of them may act simply as foreign bodies, to produce hypersecretion and inflammation, or simple meibomitis. Where one or more ducts become occluded, chalazia might develop, as foreign body granulomata do elsewhere. A similar accumulation of staphylococci might produce similar conditions. From the younger age incidence of *conjunctivite à chalazion*, however, and the greater frequency of staphylococci in it, at least in my experience, the assumption might be warranted that the staphylococci produce a sharper reaction which is apt to lead to direct occlusion and chalazia; while bacillus xerosis, more frequently present in the glands in old age, produces a more sluggish reaction and so is more apt to produce simple meibomitis. The most feasible way to test this supposition would be to inject the organism by canula into the glands and then occlude their mouths by cautery. I hope to do this some day on larger animals than were available at this time.

I wish to thank Mr. Paul Conrad and Miss Mildred Braden for their help in the laboratory work.

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SOME NEW TESTS FOR ASTIGMATISM.

ERNEST E. MADDOX, M.D.

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These are practical subjective tests. Their convenience and delicacy, proven by use, recommend them.

1. THE "V" TEST FOR ASTIGMATISM.

For this test the capital letter "V" is made to perambulate around the periphery of Snellen's small fan of lines, either with the hand, or better, with a string from a distance. See Fig. 1.

The "V" acts, firstly, as an *indicator*, and secondly, as a *confirmier*. As an indicator, it enables the surgeon to make sure as to which ray of the fan the patient sees best, without the necessity of large figures, which lessen the simplicity of the chart to the patient's eye. Having found the ray, the "V" is next used as a confirmier, to test the correctness of the patient's choice, for if the correct ray has been chosen, the two arms of the "V" will appear of an equally vivid blackness.

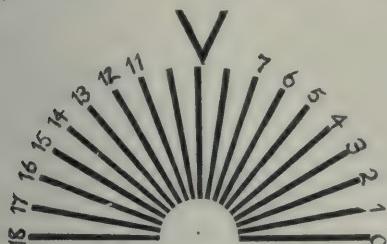


Fig. 1.—Maddox "V" Test for Astigmatism. The "V" can be moved on a semicircle until it indicates the blackest of the radiating lines; and its two arms may be compared with each other, as an additional test.

The "V" should now be moved a little to one side, until a difference appears in the blackness of the two arms, and then to the other side in the same way. In each case the blackest arm will look towards the spot for the correct angle.

If, on the other hand, before moving the "V" from the chosen ray, one arm looks blacker than the other, the patient's selection of the ray was evidently not perfect.

The "V" should always be *moved in the direction of its blackest arm* until agreement in the blackness of the two is arrived at. It will now be found to

stand opposite the correct spoke of the fan.

As in all tests of this kind, the patient's head should be held perfectly upright, and he should be made myopic for one of his two principal meridians; and emmetropic, or only faintly myopic, for the other. In other words, the case should be rendered by lenses one of simple myopic astigmatism.

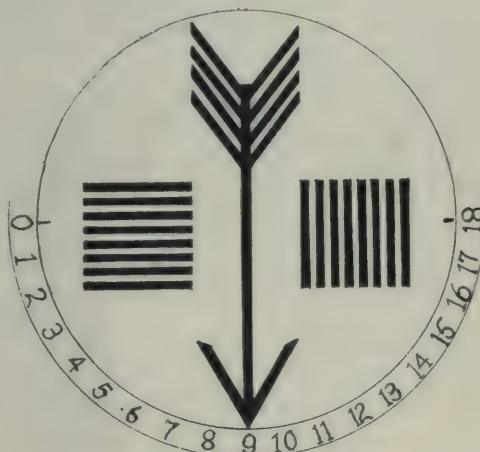


Fig. 2.—Maddox "Arrow" Test for astigmatism. The arrow is turned until its two feathers appear equally "clean," then minus cylinders are used to make the lines at right angles to the arrow as black as those parallel with it.

In most cases I find the "V" Test to be of surprising delicacy, tho with slow-minded patients repetition is sometimes necessary until they have learned how to compare different depths of black in the two arms of the "V."

One advantage of Snellen's fan is that it detects cases of irregular astigmatism. If one line be black, for example, its two neighbors faint, and the 3rd or 4th black again, the case is proved to be one for which all lines and stripes are unsuitable, and the "V" Test should not be employed. For such cases Test Types only are permissible.

2. THE ARROW TEST.

This consists of a broad arrow bisecting a large cardboard disc, rotatable about its center, and with a square of stripes on each side of the arrow. A fixed graduated semicircle below, completes the apparatus. (See Fig. 2.)

On turning the tail of the arrow in the direction of the "cleanest" feather till the two feathers appear equally clean, the arrow head points to the required axis. As a confirmation, the two edges of the arrow head should then also appear equally matched, and the shaft of the arrow show its best definition. The axis being thus determined, to find the amount of astigmatism it only remains to direct attention to the squares, and insert minus cylinders in the trial frame till one is reached which equalizes the clearness of the two sets of stripes. A small minus sign on the edge of the cardboard disc, 90 degrees from the arrow-head, indicates the axis of this required minus cylinder. It is, of course, taken for granted that the eye is made faintly

myopic for the whole chart to begin with, and before inserting cylinders the correct spherical correction should be made for the best square.

If desired, the "V" test and the Arrow test can be joined together with three cogwheels, when a single string and weight can operate the whole set from a distance.

3. INFANT'S TEST.

For very young children to whom the idea of an arrow is not familiar, and who confuse the left hand with the right, I use two squares called "pocket-handkerchiefs," one above the other, so as to require no "right" or "left," and two striped circles called "balls," also one above another.

A child is quick to see which is the "cleanest handkerchief," and the "prettiest ball," and thinks it rather a nice game.

It is needless to say that retinoscopy has to be trusted to chiefly in small children, but a subjective confirmation has its value also.

DISCIFORM KERATITIS SECONDARY TO SMALLPOX.

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In the case here reported a slight injury to the cornea occurred about the time the patient contracted smallpox. The eye became inflamed shortly before the eruption appeared, and subsequently ran a chronic course assuming the form indicated. With comments on the case are given abstracts of similar cases and a review of the literature. Read before the Ophthalmological Section of the Baltimore City Medical Society, December, 1920.

Case—Miss E was referred to me Feb. 23, 1920 by her physician, who had taken a foreign body off of the lower outer quadrant of the cornea on the 13th. The patient said that she had become so comfortable, after the foreign body had been removed, that she had returned to work, and that later it had become perfectly comfortable, but on the 17th her eye began to get red, and on the 19th became painful.

Feb. 23. A number of white vesicle-like formations are seen on the margin of the upper lid of the left eye. Cutaneous surface of the lid not inflamed. Bulbar conjunctiva shows about a half dozen red elevations in the region of the insertion of the internal rectus. The elevations are about the size of the lead in an ordinary pencil, are grouped closely together, are quite red, and do not contain fluid. Each single elevation looks very much like a phlyctenule. Other portions of the conjunctiva are injected, but there are no elevations. Cornea clear, and no mark from foreign body. Pupil active. Eye painful, photophobia and lacrimation marked.

There are a number of hard, painless, nonvesicular elevations on the forehead, face, nose, lips, and hands. Right eye normal. (Later learned that while the patient had continued with her work she had complained of feeling badly generally, but there was no particular reference to the eye until noted.)

Feb. 24th. More comfortable, eye a little less red. A very small central area of the cornea stains with fluorescein. Stained area not seen without the loupe. No change in spots on the lids, face, or hands. (Diagnosis of impetigo contagiosa and chicken-pox considered.)

Feb. 25th. More comfortable. No changes in the conjunctival elevations;

cornea clear. Referred her to a dermatologist, who made a diagnosis of smallpox. The Health Department confirmed the diagnosis, and the patient was sent to quarantine.

March 16th. Released from quarantine on the 13th. No marks on face, or hands; margins of lids normal; conjunctiva still slightly congested, altho elevations have entirely disappeared. In the center of the cornea there is a round uniformly gray opacity that is a little larger than the pupil; the opacity is not deeply situated, but apparently is in the substantia propria, and is definitely outlined. Epithelium over the cloudy area is intact; pupil active; eye not painful; some lacrimation, and photophobia, but not so marked as at the first examination.

March 20th. Lacrimation and photophobia more marked; eye very uncomfortable; pupil active. Ordered atropin 1% t.i.d. Dark glasses.

March 24th. Pupil well dilated; little change in lacrimation and photophobia; conjunctiva not markedly congested. Opacity appears to be no larger, but has extended deeper in the cornea. Patient still very uncomfortable.

March 30th. Pupil not well dilated. Atropin 2%, one drop every 3 hrs.

April 2nd. Pupil well dilated. Patient says vision is better. Central opacity is still rather sharply defined, and appears to be superficial. There is a second deeper and concentric zone of grayish opacity that is not so dense, is circular, and involves about two-thirds of the cornea. The central portion of the opacity is about three mm. in diameter, the total opacity being about seven mm. Cornea does not take stain. Wasserman negative. Hot applications and dionin.

April 9th. Patient more comfortable.

Hot applications have given much comfort. Central portion of the opacity becoming more dense; the more diffuse, deeper, outer zone has not increased in extent. Pupil not dilated. Patient reports using atropin regularly. Atropin 5% t.i.d.

April 14th. Pupil dilated, opacity becoming more sharply circumscribed. Still complains of much pain.

April 15th. Reports eye comfortable yesterday, uncomfortable last night, comfortable today. Continue hot applications and atropin.

April 17th. In the cornea between the superficial and the deeper portion of the opacity there is a clear area that suggests a separation of the tissue. It appears as tho there were a drop of clear fluid lying between the lamellae. Patient continues comfortable.

April 20th. The deeper portion of the opacity is clearing, and decreasing in size. Vesicle like formation in the cornea is unchanged. No definite wall to vesicle, contents clear.

April 26th. Patient comfortable. Vesicle decreased in size, contents clear.

April 30th. Patient continues comfortable. Vesicle practically absorbed without leaving any trace. Peripheral opacity decreasing in extent, and density.

May 10th. Cornea clearer, central opacity more dense than peripheral portion, there being a definite difference in the density of the two areas. Photophobia and lacrimation much less. Injection of the conjunctiva has passed off.

May 15th. Cornea clearer, central opacity a little smaller, outer zone smaller and fainter. Boundary line between central, and peripheral portion of opacity is pronounced; there is not a gradual transition from inner to outer zone.

May 24th. Cornea clearer, central opacity rather dense; is about the size of the pupil. Outer zone is gradually fading out.

May 28th. Central portion unchanged, peripheral portion fainter. Discontinue atropin. Dionin 1%, one drop at bed time.

June 3rd. Pupil about normal size; central opacity less dense; peripheral

opacity shows only a faint halo. Vision 20/200.

June 6th. Vision 20/120. No change in central opacity; no photophobia, lacrimation, or redness of the conjunctiva. Continue dionin. Return to work tomorrow.

June 24th. Pupil normal size, and active. A central round opacity covers the entire pupillary area; margin of opacity quite definite. Halo has disappeared. Vision 20/200. Continue dionin.

Nov. 16th. Opacity somewhat smaller than at last examination. Is $3\frac{1}{2}$ mm. in diameter, and somewhat irregularly circular; not sharply outlined, the outer margins gradually fading into the clear cornea. In the lower, inner quadrant there are numerous tiny yellowish-white pin point like spots, which are so numerous as to lie in contact with one another. By oblique illumination it is difficult to determine the position as to the depth of the opacity. Apparently the yellowish-white spots are more superficial than the general gray opacity. All irritation has passed off. Vision 20/120.

COMMENT WITH REVIEW OF LITERATURE

The case just reported presents a number of interesting aspects. The variety of keratitis is certainly a rare one. The relation which it bore to the foreign body, and to the variola, is a question that becomes all the more important because the patient was one whose case was brought before the State Accident Commission for decision as to compensation insurance.

Concerning the diagnosis, the appearance quite agrees with the description of disciform keratitis.

Disciform keratitis was first fully described by Fuchs¹ in 1901, altho, according to Weeks², it had been described by v. Arlt of Vienna as early as 1870, under the name of abscessus siccus corneae. Vossius described it in 1885, but mentioned it as an abortive interstitial keratitis.

Fuchs³ under the heading Keratitis Disciformis says, "This is a keratitis that is allied to ulcus serpens, and consists in the development in the middle layers of the cornea of a gray disc shaped opacity.

In the center of the disc a small more deeply clouded speck is commonly observed. The periphery of the disc is sharply delimited by a border of deeper gray which in many cases is made up of concentric lines. This disc-shaped infiltrate never becomes yellow, nor leads to disintegration of the cornea. Only exceptionally a small loss of substance develops over a certain circumscribed area. The irritation symptoms are mostly not pronounced and hypopyon is absent or scanty. The course is protracted, as it takes one or more months for the eye to become free from congestion, and for the infiltration to become transformed into an opacity that becomes permanent. The cause of the disease, just as *ulcus serpens*, is an infection of the cornea from without, the central grayer speck representing the point of entrance of the bacteria. The epithelial lesion that precedes the infection may often be attributed to a slight injury, and in some cases to an antecedent herpes corneae febris, but in many cases the cause remains unknown."

Opportunities for microscopic study of disciform keratitis have been infrequent. Such studies have been made by Verhoeff⁴, Meller⁵, Hadano⁶, Wagner⁷, and Kuboki⁸. In the report by Verhoeff, as well as in that by Meller and by Hadano, there is apparently some uncertainty as to whether it is a case of disciform keratitis, or keratitis profunda. Verhoeff and Meller examined the whole eye, while Hadano examined a piece of tissue removed from the cornea with a sharp spoon.

Wagner's case was of particular interest, and is related in full: "A man 77 years of age presented a large crescentic marginal ulcer that stained with fluorescein. The largest part of the corneal center looked dull, somewhat fatty, and did not stain with fluorescein. The center is yellowish-white, sharply limited; and the opacity seems to be in the corneal substance, while a much larger grayish opacity, still deeper, surrounds it. Only at the nasal side a connection between the larger marginal ulcer, and the deep central disc exists."

Because of lack of improvement and

pain, enucleation was done four days after admission to the hospital.

In summing up his microscopic findings he says: "We see that the necrotic disc is limited forward by a fairly strong infiltrated tissue, with numerous killed lymphocytes; backward, partly by a similar infiltration tissue, partly by the membrane of Descemet, partly by an agglomeration of polynuclear leucocytes, and toward the sides by living corneal tissue, which shows a moderate increase of its normal nuclear elements. Descemet's membrane is absent for about the fourth part of the corneal center. For nearly its entire extent, a single layer of lymphocytes is found between it, and the corneal parenchyma. The endothelium is nowhere present in normal condition. It is entirely absent or it is much proliferated. Spots are found where the endothelial cells are irregularly dispersed on the membrane; polynuclear leucocytes and some lymphocytes lie between these.

In other places the endothelial cells are entirely free from the membrane and sometimes at a little distance away; they then have proliferated in the fibrinous hypopyon, strongly infiltrated with polynuclear leucocytes, which cover the posterior wall of the cornea. They show a strong inclination to proliferation, which goes sometimes so far that true giant cells are present."

Wagner concludes "that disciform keratitis is characterized by a disc like part of strongly altered corneal tissue, lying deep; caused by toxins, produced by microorganisms existing in the epithelium. These toxins have not yet been discovered, but their presence we can surmise with great probability."

In Kuboki's case the disease was in the inner and lower quadrant, and showed in the center two concentric, ring like opacities. Histologic examination of a freshly cut portion showed that the opacity was due to cell infiltration, which occurred in the outer and middle layers of the parenchyma. Bowman's membrane was partially defective. The epithelial cells of the inner basal layers were irregular. The more lightly affected portions between the rings

showed cell infiltration due to edema, necrosis, and fatty degeneration.

Altho some of the features of disciform keratitis, as described by Fuchs, are lacking in this case it seems to me there can be no doubt of the diagnosis. There are but two points of dissimilarity, the first being the absence of the clearly defined ring, and the second the vesicle in the deeper structure of the cornea. There are a number of points of confirmation: A definite circular opacity, below Bowman's membrane, equal to the size of the pupil, and an outer zone involving about one-half of the remaining corneal tissue; no loss of epithelium, or breaking down of the deeper tissue; a mild iritis, no hypopyon, a marked photophobia and lacrimation; moderate injection of the conjunctiva, a long convalescence, resulting in a permanent impairment of vision.

In this study of disciform keratitis I have been impressed with the apparent confusion of disciform keratitis, ulcus serpens, and annular keratitis.

In the disciform keratitis there is no loss of epithelium or corneal tissue, except on rare occasions, and then the loss is slight, the opacity is central, circular, and may involve the cornea to any depth; it runs a long course, and results in impaired vision.

The early stage of ulcus serpens produces changes that are similar to changes in advanced disciform keratitis, but in a short time, in the ulcus serpens, there is a breaking down of the corneal tissue, ulcer formation, intense iritis, turbid aqueous hypopyon, and soon perforation of the cornea.

Fuchs⁹ describes annular keratitis as a variation of parenchymatous keratitis, and says it is that form which begins with maculae in the central portion of the cornea; and that it not infrequently happens that the maculae at a certain distance from the center are particularly dense, thus forming a very opaque ring which in its subsequent course contracts more and more toward the center of the cornea.

According to Fuchs¹⁰ disciform keratitis is an infection of the cornea from without, the bacteria gaining entrance

thru some slight injury to the corneal epithelium, and some cases may be due to an antecedent herpes corneae febris, but in very many cases the cause remains unknown.

Verhoeff¹¹ contends that it is of neurotic origin, and states that it also may be caused by nongonorrhreal ophthalmia neonatorum, due to the streptococcus mycosus.

Weeks¹² thinks that tuberculosis at times may be a cause.

Zani¹³ regards it as an infection that gains entrance thru an injured epithelium.

Nishimura¹⁴ reports a case in which the hay bacillus was isolated. But I wish especially to mention that Roemer¹⁵ states that it has *repeatedly developed after vaccine infection of the cornea*, and that Schirmer¹⁶ has also observed it from an *infection from vaccine virus*.

In discussing the importance of vaccinola to the eye, Roemer says, "In many cases the cornea becomes involved, especially when a defect is present in the epithelium, and a keratitis develops which resembles, to a certain extent, disciform keratitis. A delicate gray disc is formed, its margins denser than the central portions, which is sometimes surrounded by parallel rings. At the same time symptoms of a serous iritis appear, with deposits on Descemet's membrane. Permanent opacity results."

Schirmer writing on "Keratitis Disciformis and Keratitis Postvacciniose," reports: "The mother of a child vaccinated successfully developed an inflammation of the right eye eleven days after vaccination. After fourteen days she was examined. A vaccine pustule was found on the lower lid, the cornea had a paracentral epithelial defect of the size of a lentil, and to the nasal side of this a distinct gray circular line of infiltration of the parenchyma, perhaps even of the posterior surface, and irregular striations. The iris was slightly muddy and swollen. The epithelial defects healed over, but a large central, cloudy plaque, with a larger gray circle around it developed."

He concludes his article stating, "The term keratitis postvacciniose should be

abandoned in favor of keratitis disciformis."

Zani¹³ reports three cases, one of which follows a vaccine pustule on the lid.

Baker¹⁷ in a paper under the title "Eye Complications of Smallpox," published in 1903 describes the ocular complications observed in 2,746 cases. There were various lid, conjunctival, and corneal complications. Of the corneal complications five were noted as having small ulcers when discharged from the hospital. Two of these five perforated and resulted in phthisis bulbi.

I feel that we are justified in believing that the other three which were diagnosed as small ulcers were cases of disciform keratitis. They evidently developed late in the course of the smallpox, and were not well when the patients were ready to be discharged from the hospital.

Chance¹⁸, in American Medicine, describes eye complications observed in 2,000 cases of smallpox in Cleveland, in 1901 and 1902. He states, "The corneal inflammation may only be a slight, superficial haze confined to the corneal conjunctiva, or Bowman's membrane, or it may extend rapidly, and involve the entire cornea."

Finlay¹⁹ (1897) under the title of Keratitis Variolosa describes 24 cases of an unusual form of keratitis following smallpox that he observed during an epidemic in Havana. He states, "The usual time for the appearance of this complication is between the end of the second and the end of the third week of the disease, after desiccation has commenced; occasionally it occurs earlier, at times not until after convalescence is fully established. At this, its earliest stage, one finds at a point in the cornea, somewhere between its center and the margin, an irregularly square shaped patch, from one to two mm. square (even when involving the center of the cornea its situation is apt to be excentric). The greater part of its area is transparent, tho distinctly differentiated from the remainder of the cornea by oblique illumination with accurate focusing, and gives one the impression of a more or less large drop of fluid contained in the substance of the cornea. The edge nearest the corneal

margin, however, stands out prominently, showing a deep milky-white infiltration. The epithelium over all this area is intact. At this stage one also finds moderate ciliary injection, marked photophobia, blepharospasm and lacrimation. * * * Gradually the margin of infiltration extends over the remainder of the patch till the whole presents a uniform milky-white or yellowish color; occasionally, however, the edges show deep infiltration thruout the whole course. Whilst this is going on a partial or total desquamation of the epithelium covering the infiltration area takes place. Ciliary injection is, of course, more marked. * * * Seldom is there an accompanying iritis. Hypopyon at times is present; in none did spontaneous perforation occur. After lasting for a longer or shorter time, the objective symptoms slowly commenced to recede, the infiltration areas gradually becoming vascularized. This vascularization in its turn diminishes, and finally a more or less dense leucoma results."

This description was written, by Finley, about four years before Fuchs' description; and while there are points of dissimilarity, I believe these cases should be classed as disciform keratitis, due to smallpox infection.

Councilman²⁰ in his experimental work in searching for the organism of smallpox showed that he could inoculate from eye to eye indefinitely without any change in the character of the lesions. He showed that no other injury to the cornea of the rabbit, or no other infection, produced lesions of the same character as those produced by inoculating the cornea with vaccine, or variola virus. He inoculated from the cornea of the rabbit to the calf in the fifteenth and twenty-fifth generation, and in each obtained perfectly typical vaccine pustules. Children were vaccinated from the cornea of the rabbit in the thirty-sixth generation and typical vaccinia resulted.

Schirmer vaccinated with the gray corneal epithelium of one of his patients upon the cornea of rabbits, and guinea pigs, and produced disciform keratitis. Subsequent vaccinations from them to other animals reproduced the disease.

Nishimura isolated the hay bacillus from his case of disciform keratitis. The same form of corneal lesion was reproduced experimentally in the rabbit.

Zani interprets one of his cases as the result of nutritional disturbances of the cornea, consequent upon intense chemosis, thru which the specific organism gained entrance.

It is quite apparent that disciform keratitis that originates from vaccinia or variola is an infection that gains entrance into the cornea thru a defect in the corneal epithelium, and that it comes on late in the course of the smallpox.

In the case under study the foreign body was removed from the cornea four days before the eye became inflamed. Eight days later when the patient was removed to quarantine, the conjunctiva showed elevations that were analogous to those on the lids and face that later developed into pustules. At this time the cornea was clear. It seems reasonable to suppose that had the cornea been infected thru the break in the epithelium caused by the removal of the foreign body, and with the original infection, there would have been corneal changes of the same stage of development as in the conjunctiva, and on the lids and face. Such changes were not present. It is likely that the infection of the cornea did not occur at the time of the primary infection, but that it occurred in the later stage of the disease; possibly thru the break in the corneal epithelium that was present seven days after the conjunctiva began to get red. At this time (of conjunctival inflammation) elevations that resulted in pustules had formed on the lids, forehead, and face, but the cornea showed no sign of involvement. When the cornea did become involved is uncertain. On this point the patient could give no information.

The onset of her smallpox was about the time that she got the foreign body in the eye. After the removal of the foreign body she returned to work, and in a few days began to feel very badly, (the eye in the meantime having become quite comfortable). During that time, the patient states, she had headache, and could hardly continue with her work.

According to Story²¹ and also to Chance, smallpox pustules do not form on the cornea. They may form on the conjunctiva near the limbus, when extension into the cornea may follow. Chance further states that corneal complications also may arise during the stage of desiccation, when the contagion is transmitted from the broken down pustules, as, for instance, those of the skin or the eyelid.

Parsons²² states that the cornea is never involved before the 10th day, and generally it is the 12th to the 14th day.

In the cases reported by Finlay and by Harlan²³ the opacity appeared near the end of the second week, or even as late as the beginning of desquamation.

It is quite likely that the infection in this case occurred from the pustules that had formed on the lid, and conjunctiva. On her return from quarantine, which was 28 days after the eye first began to get red, and 20 days after the last observation, the corneal disease was in its early stage. This is shown by the small central opacity, and by the later extension of the opacity, and still later by vesicle formation, and a prolonged convalescence.

In the inoculation experiments the virus was injected into the cornea of healthy guinea-pigs, rabbits, and calves, the animals not having undergone the reaction from vaccination or from smallpox, and the lesion of disciform keratitis was not produced. So too in the corneal lesions that are reported as following accidental vaccine infections, there was not produced the picture of disciform keratitis; but a much more severe reaction, and a much more serious breaking down and loss of corneal tissue. This was seen in Caillaud's²⁴ case in which there occurred an injury to the cornea in vaccination, and three days later a central ulcer with the deep and slowly healing abscess, leaving a large scar. Almost similar conditions have been observed by Snyder²⁵ and by Story²⁶.

In the type of keratitis under discussion the corneal infection appears to occur after the pustules are formed, sometimes as late as the period of desiccation, the blood in the meantime having had time to react against the toxin, so

that when the second infection occurs, which involves the cornea, the reaction is not so severe.

Because there had been a foreign body on the left cornea near the time of the onset of the smallpox, the patient believed that the loss of vision was due to the foreign body. She made such a claim before the State Industrial Accident Commission. The Commission accepted her opinion, and awarded her compensation for the loss of an eye.

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I am of the opinion that the corneal changes that at times occur during the progress of a case of smallpox are the result of a secondary infection, and that the corneal reaction is less severe because of the previous systemic reaction to the same toxin.

The indications are that disciform keratitis secondary to smallpox is a specific inflammation, probably as specific as the pustule itself.

OCULAR DISTURBANCES IN ENCEPHALITIS LETHARGICA.

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ARNHEM, HOLLAND.

In reporting two cases seen by himself the author compares them with the cases that have already been published in Holland and reviews the accounts given of this disease in other countries. The general symptoms are considered and then the ocular conditions, motor, visual, and pupillary are each taken up in detail.

Among the many epidemics which during the last few years ravaged the old and the new world, many cases of lethargic encephalitis were published. (In Australia and Austria in 1917, in England and France in 1917-1918, in America in 1919). In Holland 15 cases were published in 1919 and 1920, to which I can add two new cases. Tho the diagnosis could not be made from the presence of any constant syndrome of clinical symptoms, to many investigators, the ocular symptoms have proven so helpful in fixing the diagnosis that they were estimated to be the most important; and especially because this disease is characterized not only by the frequency of the well known isolated or combined nervous paralysis, which we meet in other infectious and nervous diseases, but because supranuclear disturbances of the fibres or centres of associated movement, often preceding the other symptoms, were noted.

Nonne assigned an independent place to this illness, in contrast with three other diseases which gave differential diagnostic difficulties: (a) nona in which bulbar symptoms were absent; (b) premature paralysis agitans which proceeds more slowly and without inclination to sleep, (c) bulbar paralysis, in which changes of the ocular muscles and pupillary changes were absent. Moreover there are many other affections with which this encephalitis can be confused, but these can be safely dismissed here. Nonne called this illness epidemic bulbar myelitis and encephalitis of the crura cerebri. He gives account of the following details.

The affected persons, who either shortly before suffered from influenza, or not, or whose associates had suffered from it, or not, and who neither had had tuberculosis, lues, nervous diseases or psychoses, and who did not use alcohol or narcotics to excess rather quickly contracted encephalitis without many general symptoms. This encephalitis pro-

gresses more or less gravely, or shows an abortive form, and cannot be recognized to be an inflammation by examination of the cerebrospinal fluid. This has not proved true. There have been found in some cases, high pressure, leucocytosis, poikilocytosis, and the postile reaction of Nonne. In the blood can occur a slight leucocytosis.

Most cases heal entirely, but in a few cases there remain permanent disturbances of the cerebral nerves, and among them the most important is the reflex and absolute fixity of the pupil. Hence the Argyll-Robertson phenomenon can not be considered pathognomonic for syphilis. There also often remain athetoid and choreic movements in the limbs, and physical and mental weakness. Death followed in the minority of cases. I found the following figures: in France there was mortality in 33% (Netter), in England 25%, in Austria 45% (bad condition of nutrition?), in America 10% of the clinical cases.

Nonne further draws our attention to the extrapyramidal disturbances of motion. The members of the body take a passive attitude, there is a general rigidity in the muscles, there is mimical stiffness, now and then there are tremors in different muscles and rhythmic contractions of the muscles of mouth and cheek. The reflexes are normal. The vesical function may be insufficient. There may be apathy or changes of disposition. Often there is no fever. Sleepiness is the cardinal symptom. About the paralysis of the cerebral nerves, I will speak in connection with the discussion of the cases published in Holland.

In 1920 Economo has described a new epidemic with toxic, tabetic and poliomyelic symptoms. Pathologic-anatomic investigations have shown that the symptoms are due to nonpurulent polioencephalitis with hemorrhages and degenerative processes in the great basal ganglia, especially in the thalamus opti-

cus and the midbrain (corpora quadrigemina, aquaeductus sylvii, floor of the 4th ventricle); also now and then small cell infiltration of the leptomeninges and pial septa of the spinal cord, (von Economo, Stern, Oberndorfer, Nonne).

The virus is not known. Grampositive diplostreptococci were found by von Economo, von Wiesner and Stern, and a filterable virus by Loewe and Strauss, (very small cocci). Bacteriologic studies of the blood had no result. Various investigators, as Nonne and Netter, have drawn our attention to the fact that this encephalitis is characterized by the motor apparatus of the eyeball only being disturbed, externally as well as internally. Bollack states there is no impairment of visual acuity or fields, or of the sensibility of the cornea and conjunctiva. The last has not proven true. Nonne describes absence of the corneal reflex and hypesthetic skin and mucous membrane, also affections of the motor part of the fifth nerve. Three Dutch authors, van Wyke, Bosman and Hacke, also mention affections of the fifth nerve, in contrast with Bartels, who did not find them. It is my opinion that the first part of the utterance of Bollack too must be revised, and likewise Bartels' opinion that the negative findings of the pupil are of differential diagnostic importance.

I acquired this conviction because I observed a case with bilateral ring scotoma, which started at the blind spot and was doubtless not functional. In examining the literature, I found that this discovery is new. But it is incorrect to think that other investigators found the optic nerve always healthy. Von Economo and Bartels once found a slight retrobulbar neuritis, and once a beginning optic atrophy. The latter author describes a temporary paracentral scotoma—so this case shows resemblance to mine; and another time contraction of the visual field for green. Oberndorfer saw once in 8 cases a slight optic neuritis; and Hiram Woods and Shumway saw the same, each once in six cases (the patient of Shumway died afterward).

In consulting the Dutch literature it struck me, that just there so many ocular affections were mentioned; in adding my case to the observations of Henkelom, Cramer and Hacke, I find them 10 times

in 17 cases. It is true that the described symptoms: $V=1/60$, slight paleness, slight edematous swelling of the papilla, slight venous hyperemia of the background, are not of such importance that they may give rise to far-reaching conclusions; but undoubtedly they plead more for than against the meaning, that the optic nerve can also be affected in lethargic encephalitis. I think that the somnolence of the patients often prevented the investigators taking good visual fields.

My patient's history is the following:

CASE 1. D. W. M. age 23 years, consulted me April 26, 1920 with the following ocular symptoms: anisocoria, the left pupil (5 mm.) is wider than the right, (3 mm.) and shows neither a direct nor a consensual light reaction, nor a narrowing on converging. The right eye only shows a very slight direct and consensual pupillary reaction. The temporal part of the papilla is paler than that of the left eye. The accommodation is paralyzed on both sides and the patient cannot look downward. V. R. 4/18; L. 4/18, Hyperopia 1 D. and 1.25 D. Vision after correction R. 4/12; L. 4/8.

The man had been sick for some days, he had perspired abundantly, had had pains in arms and legs; he gave an impression of somnolence and had mimetic stiffness. In the course of the first week it appears that the patient is sleepy and dull, tho he can be talked to. His voice is monotonous and low (bulbar paralysis). He is unable to wrinkle his forehead. He does not vomit and has no headache. He has a tremor of his head and hands, and rise of temperature that remained till his departure after 6 weeks, and fluctuated between 37.2 and 38. (in the evening generally between 37.6 and 38). This made the neurologist, Dr. Drossaers, and myself think of a disturbance of the center of heat regulation in the thalamus. Moreover a precise examination of the eyes showed a very slight ptosis and a very slight paresis of the recti externi, with a paresis of the convergence.

On April 29th the direct light reaction of the right eye was also very slight, but the following day was restored somewhat. After May 3d he could again wrinkle his forehead. On May 6th there

was again a consensual and direct light reaction in the left eye; whereas the reaction of convergence which was present on the right side remained indistinct on the left side. Gradually speech improved. He opened his mouth somewhat obliquely (paresis of the right pterygoid). Difficult movement of the oral and nasal muscles, chiefly on the left side. Lying on the floor the patient could raise his eyebrows, standing he could not do so.

The lumbar fluid contained 11 cells per mm. (Fuchs-Rosenthal method.) Later on Dr. Reinders Folmer found 8 per mm. The reactions of Nonne and Wassermann

weeks, as well on the perimetric arc as on Bjerrum's screen at different distances, and always found the typical ring scotomas on congruent places. The peripheric contraction diminished a little gradually; the ring scotomas remained. The patient went away with a slight improvement of the accommodation, the pupillary reactions and the downward movement of both eyes.

CASE 2. Y. G. R., aged 42, came January 26, 1920 with complaint of diplopia and the letters growing dim when reading (paresis of accommodation). His visual acuity of each eye with C+0.5, cy.=5/6. He had esophoria and



Fig. 1.—Fields of vision in Case I showing peripheral contraction, and ring scotoma thru the blind spot, in each eye.

were negative. The sediment contained no tubercle bacilli, and agar and ascites cultures did not germinate. In the first week the patient was too dull to allow his visual fields to be mapped out. After 2 weeks I found a concentric contraction of the periphery on both sides, (Fig. 1, Case 1.) on the left side of a wing shaped enlargement of the blind spot, and on the right side a ring scotoma, taking its origin from the blind spot, which also was enlarged in the horizontal direction. Everywhere it was between 10° and 20° away from the center, and had a breadth from 2° to 5°. After a few days I noticed that also the left eye showed a ring scotoma about the same shape. In order to exclude as well as possible the presence of a functional symptom, I determined these scotomas four times in the course of the following

the next day convergent squint. Moreover he was sleepy and dull, had mimical stiffness, slight ptosis on both sides, and unequal pupils, which showed no light reactions. The width of the right pupil was 3 mm. that of the left one 4 mm. On January 28th, he had a divergent squint with a paresis of the convergence, (Fig. 2, Case 2) and a slight insufficiency in moving his eyes downward. In attempting the latter he got vertical nystagmus.

He remained from February 3 until March 11 in clinical observation. Almost during the whole month of February, he showed a rise of temperature, fluctuating between 36.° and 37.9°, rarely 38.°, in the second half of February it fluctuated between 36.8° and 37.5°. In March the fluctuations had still narrower amplitude. In the first weeks the pulse changed be-

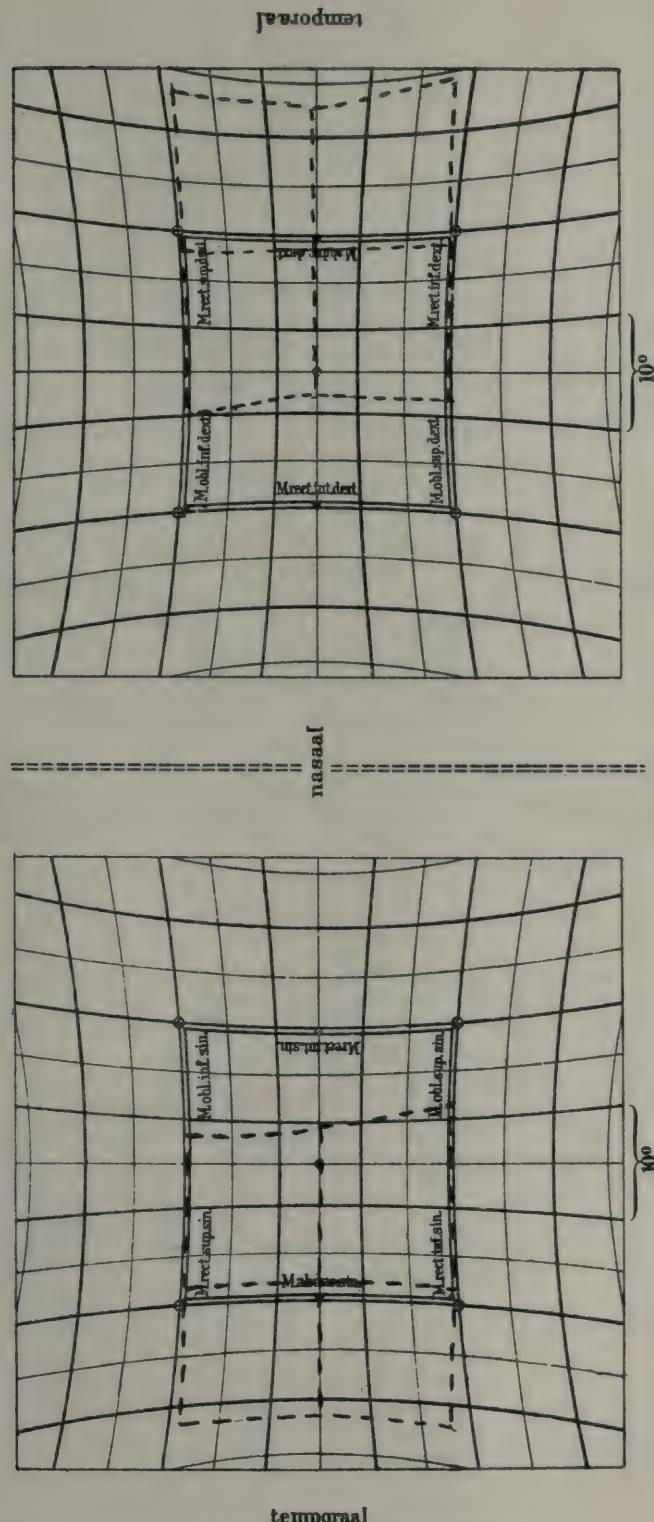


Fig. 2.—Fields of fixation in Case II showing paresis of convergence.

tween 110 and 95, diminished somewhat with the temperature but remained too frequent. Such was also the case with the respiration. From time to time the patient was short of breath and oppressed. He slept very much during the first 10 days, sometimes waking with a start by day. His mind was clear. No difficulty in urinating, no disturbances of the reflexes. Slight general hypertonia of the muscles. In the beginning he lay on his back for hours in an apparently passive attitude. Low monotonous voice, rigid smile, trembling mouth corners. On both sides a light facial paresis. When after 3 weeks the patient again tried to

tical tremulations were seen. The left pupil was still somewhat wider than the right one; the direct and consensual light reactions were feebly present, the reaction of convergence was absent. Moderate contraction of the left visual field. Normal blind spots.

December 14, 1920. The best proof of there being a persistent paresis of the convergence was that an advancement of the left rectus internus which I performed in July, 1920, to try to deliver the man from his spectacles of opaque glass and restore his binocular vision, at least for the distance, had only a temporary success. The left eye gradually deviated,

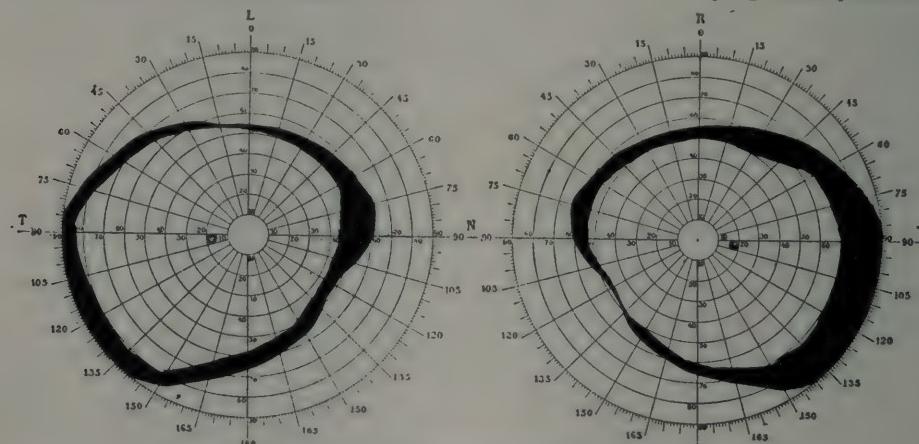


Fig. 3.—Fields of vision in Case II showing slight concentric contraction.

walk, he had to do this very carefully. At the end of January the convergence reaction of both pupils disappeared also, (absolute rigidity). The visual fields were moderately concentrically contracted. (Fig. 3, Case 2.)

The patient went home with a manifest divergent squint of inconstant amount. He worked again with a ground glass before one eye. The paresis of accommodation disappeared rather quickly. On June 25th, the patient was again sleepy. He had still a divergent squint, but temporarily could bring both eyes to the median line when fixing a near object. Soon after the left eye wandered outward. In looking downward, which he was able to do again, the divergence diminished. In looking upward it increased. The visual fields were normal, only shifted over each other in a horizontal direction. In looking upward ver-

so the situation in December was about the same as in June. The left internal rectus showed little nystagmus on looking extremely to the right. The pupillary reaction of convergence was entirely absent. Looking downward was accompanied with slight vertical movements. Fibrillar trembling in the right orbicularis. Accommodation normal. Pupils of equal size. (3 mm.) In February the situation was the same as Dec. 20.

COMMENT.

It is interesting to discuss these two observations in connection with the other Dutch cases published in the Nederlandsche Tijdschrift voor Geeneskunde in 1919, (Beck, v. Wyke, Liegebeek, v. Henkelom, Bosman and van der Tak) and in 1920 (Cramer, Hacke, Kruijsinga). Altogether 15 cases, of which 8 were described by Hacke. It is not easy to give a general review of the Dutch

cases. As the syndrome often is not very characteristic, many cases will not be recognized. It is also very probable that many cases were not published. Wolff says in a report that in 3 weeks he saw 4 cases; Cramer says that in 1918 and in 1919 he has also treated these cases, and that in 1920 he had heard of new ones. I know that in Arnhem the diagnosis has been made by others besides me. The following symptoms have been observed in Holland:

GENERAL SYMPTOMS. As a rule the illness began acutely with the well-known general symptoms. In 2 cases only the inclination to sleepiness or dullness was absent (van der Tak; case 2 of Hacke.) Sleeplessness twice preceded the lethargic state, and among the symptoms of irritation, we notice psychic disturbances as anxiety, depression, hallucination, delirium, aggressive attitude, etc. In 3 cases there was no fever. Acceleration of the pulse existed in half of the cases. Frequently the urine contained albumin, and sometimes uroblin. Irregularities in urinating, retention as well as incontinence, were described 8 times. Two persons suffered from excessive perspiration. Where the reaction of Wassermann was done, it was negative.

There were no meningeal symptoms. Stiffness of the neck was not found at all, and only Cramer observed Kernig's symptom in a slight degree. Dermo-graphia has often been seen. In 7 cases a lumbar puncture was made. The fluid was clear and stood under normal pressure. The reaction of Nonne was slightly positive in the case of van Wyke, and in 4 cases of Hacke. A slight pleocytosis was found 3 times. Once (Henkelom) the blood showed a slight leucocytosis, and once (van Wyke) the bacillus of van Hoogenhuyze could be cultivated from it, as is the case of influenza. In general the illness proceeded favorably, healing slowly or quickly. Twice death followed (Beck, Cramer). A pathologic anatomic examination of Cramer's case showed no macroscopic changes. A connection with influenza could not clearly be determined. Only 2 patients (Beck, Henkelom) had suffered from it half a year before. In 3 other cases the illness started like influenza, a

few weeks earlier, and one woman's husband had had it.

SENSORY SYMPTOMS. Initial pains were found either in the back of the head (3 times) or in the abdomen and thigh (2 times, Hacke); others suffered from paresthesia (5 cases, one with strong itching) hypesthesia or hyperesthesia either in the region of the trigeminus or of the neck, trunk and limbs, one of a very constant nature (Kruisinga). Weakness or absence of the reflexes of the abdomen were found sporadically, sometimes the tendinous reflexes were more or less strong, and a positive reflex of Babinski has been temporarily present in the case of Leigenbeek, and an inclination to this was described in the first case of Hacke. Sometimes ataxic disturbances were mentioned as temporary phenomenon; Romberg's symptom was twice positive (Bosman, Kruisinga).

MOTOR SYMPTOMS. In the Dutch cases motor disturbances come to the front (14 times in 17 cases). 5 times hypertonia is mentioned, while tremors and convulsions, choreic and fibrillary in lips, hands, feet, arms, legs, muscles of the trunk, very different in strength, are mentioned 12 times; 5 times the patient walked uncertainly and very carefully.

DISEASES OF CEREBRAL NERVES. We did not often meet with symptoms of bulbar paralysis. Once there was salivation (Cramer). Once the patient had great difficulty in swallowing (Bosman). Once the tongue could, only with difficulty, be presented, and twice the patient had a low monotonous voice. Auditory and vestibular disturbances are not described. Six times the facial nerve was affected, mostly in a slight degree; 6 times the patient had a mask-like face. Twice there were slight motor differences between different parts of the face. Twice a unilateral, once a bilateral paresis. As we saw above there occurred 5 times an affection of the trigeminus, twice the corneal reflex was absent, 3 times the motor part also was disturbed.

OCULAR SYMPTOMS have also been seen in Holland, altho not so as to dominate the condition. In 8 cases ptosis occurred, it was more or less fugacious. In my two cases the ptosis was of such a slight degree that it impressed me as be-

ing the result of a change of the tonus, a parallelism can be drawn between this and the mask-likeness of the face, neither of which was the result of a real paresis.

Diplopia has been stated 8 times, 4 times combined with ptosis. In the case of Bosman it lasted only one day. Paresis could not always be determined. Van Wyke's patient alternately had crossed and homonymous diplopia. Thrice a slight convergent squint was noted (Beck, Hacke, Kruisinga and my second case in the beginning.) Kruisinga's patient suffered from a paresis of the abducens on the left side. The patient of Liégebeek van Henkelom had a divergent squint with paralysis and paresis of the superior recti, and probably also of the trochlears (de Haas). Temporarily, only the outward movement of the eye was present; in Cramer's case the patient had great difficulty in keeping the eyes in an extreme position, and in the 5th case of Hacke rotatory nystagmus developed, when looking to the left or to the right.

In comparing my own cases with the others published in Holland it struck me that mine showed many interesting symptoms which made them resemble none of foreign publication. Paralysis of the accommodation and convergence and anisocoria are missed in all Dutch communications. Liégebeek van Henkelom alone says that the left pupil of his patient showed less reaction than the right. And Hacke tells us that the left pupil of his first patient reacted little to light and convergence.

The most important symptoms which I found in my cases are: ocular diseases, paresis of accommodation and convergence, long lasting anisocoria, temporary rigidity of the pupil and disturbances of the associated ocular movements. The latter is also reported by Liégebeek van Henkelom only (paresis in looking upward). Before ending this article I will make some remarks on these interesting phenomena.

VISUAL DISTURBANCES. In my cases the defects of vision are due to retrobulbar neuritis. Tho it is true that some cases of hemianopsia have been published, viz. Burrard and Greenfield, the regular form of the rings pleads against the improbable hypothesis that these rings should be interpreted as the acci-

dental combination of bilateral hemianopic defects of a peculiar shape. Intraocular diseases and reflex disturbances of blood circulation to the intermedial part of the choroid or the ciliary vessels can be excluded. Moreover ring scotomas have been discussed in multiple sclerosis. (Uhthoff, Wilbrand, Sänger); in hereditary neuritis, (Wilbrand, Sänger); in lues, (Igersheimer, Marx); in retrobulbar neuritis (von Graefe), and have been made very probable in afflictions of the optic nerve arising from various clinical causes (Gjessing, Morgan, MacWhinnie, Russ, Woods, Haus). In some of the latter cases functional disturbances could not quite be excluded. I will draw the attention to two facts: 1. That in these illnesses the ring scotomas were not always isolated, but often connected with central scotomas or enlargement of the blind spot. 2. That the ring scotomas often had inconstant and capricious shapes.

Besides the above mentioned diseases and in glaucoma, ring scotomas have also been found by von Szily and Löhlein in papilledema. There also they had irregular shapes and developed gradually.

I have had the opportunity to find ring scotomas in several cases of glaucoma. They are broadest on the side opposite to the blind spot. As a rule there are here two half rings which are displaced from each other at the raphe of the retina. I found a more regular form of the rings not only in the above mentioned case, but also in two other persons. The first time in a young man of 21 years who had optic neuritis, nonluetic. Rhinologic examination was negative. When his neuritis improved under a treatment of KI, Hg. and sweating, the inflammation of the papilla gradually changed into atrophy of the upper third to fourth segment of the papilla, indirect image, which continued in a narrow white annular rim round the papillas. In a second case, a girl of 15 years, I had the left ethmoidal sinus opened, notwithstanding the negative rhinologic findings, and the ring scotomas showed a tendency to disappear. I found half rings in the front of Bjerrum's scotoma besides in glaucoma, also once in optic neuritis, once in neuroretinitis albulminurica.

Tho we have the right to conclude from the existence of ring scotomas that there is a retrobulbar neuritis, this does not imply that in accepting this we can quite explain the ring scotoma. In the visual field they lie between the central and peripheral parts of the retina, but that is no reason why they should be due to ring shaped fibres in the optic nerve. The above mentioned case of the young man with the segmental atrophy of the papilla and the observations in glaucoma, where there remains a free space between the paracentral scotomas and the peripheral scotomas, is significant. It would lead me too far to go deeper into this matter, or into the, as yet undecided, question whether the fibres situated in the axis of the optic nerve go to the periphery of the retina (Leber, Bunge, Fuchs, Van der Hoeve), or to the central parts of it (Passow, Uhthoff, Wilbrand-Sänger, Iggersheimer, Seidel).

PARESIS OF ACCOMMODATION. Lethargic encephalitis is distinguished by strong polymorphism. While Cords says that paresis of accommodation belongs to the less frequent symptoms, Bollack tells us that it is the chief characteristic, as he found it in 90% of the cases (18 in 20) 5 times it was complete, 13 times it was a paresis. He adds that it may last for months. Bartels quite agrees with this, he reckons it among the prodromal symptoms and found it in 72% of his cases (8 in 11) perhaps even in 100%. Paresis of accommodation may also be found in syphilis, botulism, and diphtheria. In botulism it may be accompanied by a total paralysis of the sphincter, which is absent in diphtheria. This is important with a view to the differential diagnosis.

In Holland we found paresis of accommodation only in my cases, (this is 11%, namely 2 in 17). This is remarkable, 15 patients being younger than 40 years, so presbyopia cannot be the cause of this paresis not being noticed.

PARESIS OF CONVERGENCE. My cases are the only ones in Holland, in which paresis of convergence was mentioned, so this makes 11% (2 in 17). In my first case there was a paresis, in my second case the paresis developed into paralysis. The pupillary reaction in convergence was absent on the left side of one patient, and on both sides of the other

patient. Bollack found it in 35% (7 in 20). Bartels has discussed paresis of convergence where the nervous impulse was unable to give a pupillary reaction. In his other cases the pupillary reaction was parallel to the degree of possibility of convergence. Cords presented 3 cases of paresis of convergence, in which twice the pupillary reaction was absent, tho the accommodation was normal. In one of these cases there was a temporary rigidity of convergence, while light reaction was present. When converging was again possible, the pupillary reaction also returned.

From my second case we learn that the fibre tracts for accommodation are separated from those for convergence, but that the latter are closely connected with those for the pupillary convergence reaction. The observations of Cords, Bartels and myself are interesting, because Bielschowsky tells us that normal convergence pupillary reactions exist in patients who are able to accommodate but cannot converge. My second observation is not in accord with this opinion of Bielschowsky. So there seems to result from the observations in lethargic encephalitis that a closer connection exists between the impulses for convergence and narrowing of the pupil than between the latter and the impulse for accommodation.

In my second case the paresis of the convergence had been preceded by an irritation of the convergence. Such an irritation of the convergence I also took for granted in a third patient (Fig. 4, Case 3). A man of 29 years suffered from the following symptoms: dullness, slight ptosis, mimical stiffness, and acute homonymous diplopia with convergent squint and normal looking fields.

ANISOCORIA. As the anisocoria which I found is one of the cardinal symptoms, it seems strange that it was not mentioned in the other Dutch publications. (Bollack found it in 70%, 14 in 20 cases.) The following possibilities exist. Either both pupils are wider than normal, or they are narrower than normal, and that in a different degree in both cases. One of the pupils is wider or one of the pupils is narrower than normal. It is remarkable that nowhere

in the literature are wide pupils mentioned. From this we must conclude that a complete paralysis of the sphincter did not occur.

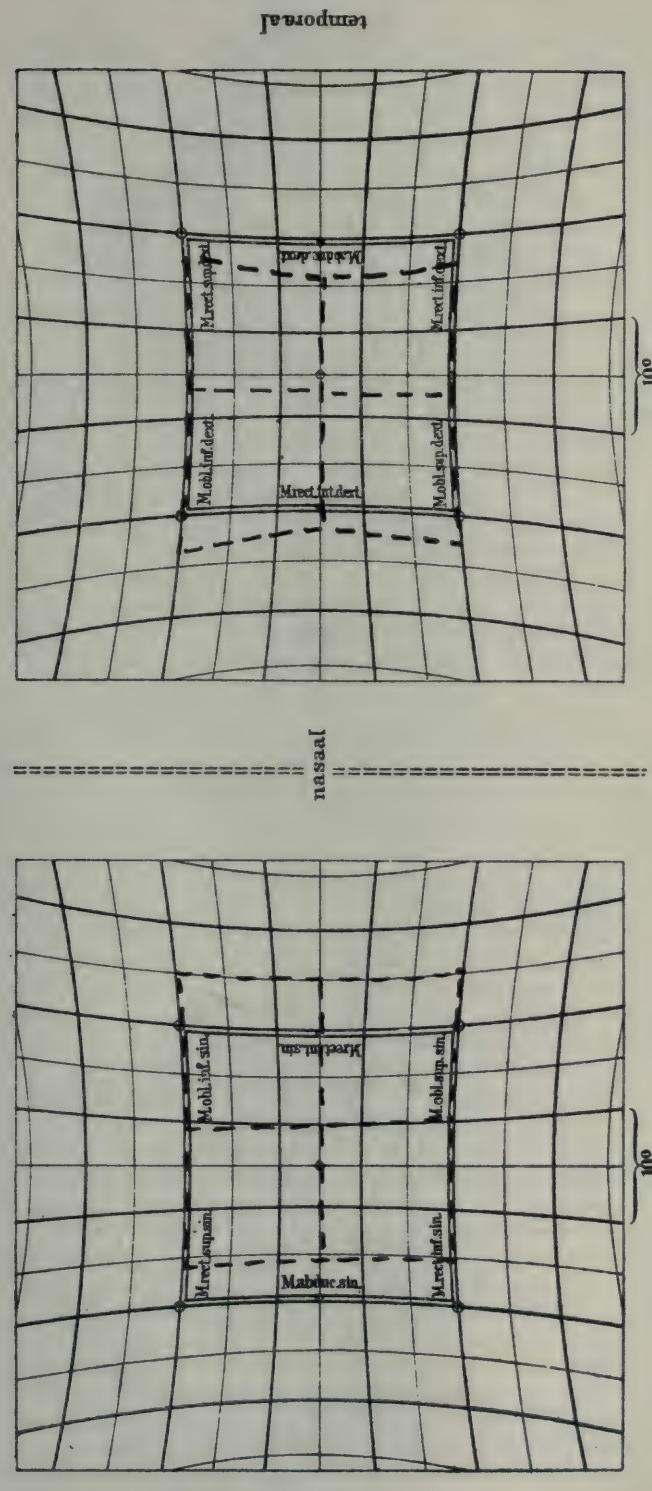
Notwithstanding the dilatation of the pupil was only slight or quite absent, disturbances of the *pupillary reflexes* have been noticed, a few times also in the Dutch literature (see the above mentioned). The abnormal pupillary reactions seem to be of a transient and variable nature in contrast with the disturbances of accommodation. It was like this in my first case, and there exists no parallelism between them. A total rigidity of both pupils is very rare, but a total rigidity of one pupil also does not occur very often. There generally is a slow reaction, or a reaction with a slight amplitude. Bollack never found the symptom of Argyll-Robertson, which I observed during a few days in my second patient. The fact that my two patients also showed a total rigidity of the pupils is interesting too, especially in my second patient who had it in both eyes.

In order to explain the fact that the pupillary reflexes can be absent without the pupil being wide, Bartels accepts an irritation of the nuclei of the sphincter, because he noticed twice a contraction of the pupil during an attack of encephalitis, as sometimes occurs in meningitis. In this way he also explains the absence of dilatation in the dark. That this would explain the often short duration of the pupillary symptoms, too many difficulties are connected with it. In my opinion the pupil is, in most cases, not narrow enough to prevent further contraction; in cases of sympathetic paralysis the narrow pupil still reacts very well. Moreover it is difficult to accept a chronic spasm from the nuclei in those cases where the stiffness of the pupils remains for years. I do not agree with Cords when he says that an absolute rigidity of the pupils points to a damage of the nuclei of the sphincter, for this cannot explain that in his first case the width of the pupil was only $3\frac{1}{2}$ to $4\frac{1}{2}$ mm. On the other hand we are not compelled to accept a hypertonic or contracted sphincter, because it is not narrower than normal. Moreover in lethargic encephalitis we do not meet with a prolonged irritation of other nuclear

regions, i.e., spasm of accommodation, etc.

I think we can explain it in the following way: because the nuclei of the sphincter must be small, the hypothesis is not hazardous, that all supranuclear reflex paths which attain this nucleus from about the same direction, must lie very close together in some place. Now if we accept a partial or total destruction of these paths, whether or not accompanied by a slight irritation or paresis of the sphincter nucleus, then many facts can be explained in a plausible way, i.e., the long duration of the condition, the restoration in a different sequence, the different combinations of symptoms, etc. Thus a normal reaction of convergence can be combined with an isolated paralysis of accommodation, and the other combinations above mentioned. That there should be no reaction in the dark gives no difficulty, because it is more probable that the wideness of the pupil in the dark is owing to diminishing of tonus of the sphincter, rather than to active irritation of the dilatator. My second case in which the internal recti functioned well separately, but converging was impossible, points to a supranuclear disease, just as the other cases of plain paralysis of the convergence. Cords' hypothesis is that a recovering sphincter nucleus should first react on the stronger impulse of light, and then on the weaker impulse of convergence. But accommodation is not of great value in my opinion, because we do not know if this sequence is found in all cases.

PARESIS OF THE ASSOCIATED MOVEMENTS. We reckon among the associated movements of the eyes the movements of the bulbs in lateral, upward and downward directions. These, too, are often disturbed in encephalitis lethargica. This is combined with a total or partial contraction of the homonymous part of the field of fixation. It is noteworthy that in this disease the ocular paralysis in the vertical direction, which is very rare in general, predominates over the horizontal. Bollack found 4 times a disturbance of the upward direction, thrice of the downward direction, twice of both movements together, twice of the bilateral horizontal direction, once of a unilateral horizontal



temporal

Fig. 4.—Fields of fixation showing irritation of convergence in Case III. (See p. 587.)

movement. Neither Bartels nor Cords ever saw a paralysis of the lateral motion. Cords gives no numbers, but he especially draws attention to the paralyses of the downward motion, which according to Uhthoff and Bielschowsky are as a rule very extraordinary. Bartels saw a paralysis of the upward as well as of the downward motion, without a noticeable preponderance of the latter.

So both my cases with paralysis and paresis of the downward motion are an illustration of what others have found also. The existence of a supranuclear vertical paralysis of vertical motion seems to me more difficult to prove, however, than that of a supranuclear lateral paralysis. For the former may just as well be due to a bilateral nuclear or an infranuclear affection. In my cases the disturbances of the fixation showed an inclination to get well, they did not, however, last such a short time as Bartels describes. One of my patients showed a nystagmus in the vertical direction, especially in looking downward, but also somewhat in looking upward. Nystagmoid convulsions have been mentioned in many publications and reports. They may be understood as belonging to the "nystagme saccadée," as a result of the struggle between the consciously directing impulse of the will and the impulses that draw unconsciously toward a deviating direction. Similar symptoms are found in latent nystagmus. According to Bollack the nystagmoid movements which can be induced artificially by moving the head, or of the visual fields, occur in three ways: either simultaneously with a paresis, or during the restoration of a paresis, or even without paresis. In the latter case it is a sign of a disturbance of the associated movements as it is in disseminated sclerosis. Bollack found it 8 times in a horizontal, 6 times in a vertical and 2 times in both directions.

Whether symptoms of vestibular nystagmus occur in lethargic encephalitis is somewhat difficult to decide. Bartels, as well as Bollack, thinks this is the case. Bollack has examined 7 patients and has found 5 times a dis-

turbance of the caloric nystagmus, and once of rotatory nystagmus. From that he concludes that there is a disturbance of the vestibular nuclei, or of the connective fibres between them and the nuclei of the oculomotors, or the tonic centers of the conjugated movements.

LOCALIZATION OF NUCLEI AND FIBRES. It was hoped that the study of lethargic encephalitis would help us in the localization of the tracts, fibres and nuclei. Yet we have not gotten much farther than the hypothesis. The paralysis of convergence which has been observed speaks for the existence of a center of convergence, which is placed by Bartels and Edinger in the median nucleus of the oculomotors which consists of great cells. Bernheimer held this to be the nucleus of accommodation. The most frequent combination of paralysis of the ocular muscles is ptosis and a disturbance of accommodation. This is why Bartels accepts that these nuclei must lie close together. Cords and Bartels also surmise the center of the levator and the supranuclear fibres or center of fixation to lie close together, by reason of combined paralysis of both. Until now a disturbance of the upward and of the downward fixation has only been accepted in the rare diseases of the corpora quadrigemina. Spiller (Handb. d. Neurol. 7, 2, p. 735) has found an affection of the corpora quadrigemina near the aqueduct in 19 out of 20 cases of vertical paralysis of downward fixation. An isolated disturbance of the downward fixation has not been discussed in these cases. The supposition that disturbances of the upward fixation should be due to a disease of the posterior corpora has not been justified by experiments on animals. The disturbances of the lateral fixation, which only Bollack has observed, must be ascribed to an affection of the fasciculus longitudinalis posterior.

It seems to me that these investigations have as yet not given many results, and even are unable to give them, firstly because of the diffuse extension of the processes, secondly because we possibly make a mistake by

localizing the frequent combinations of paralyses close together. We should not forget that besides the oculomotor, the facial, which lies at a great distance is often attacked. In order to explain all the other symptoms also we must accept foci to lie more dispersed rather than to be in continuous connection. Just as in diphtheria, botulism and other diseases, we must accept an eclectic action of the virus for definite cerebral parts. The nucleus of the trochlearis which lies close to that of the oculomotor often seems to be saved. The diagnosis of such a case being, however, very difficult, it may be sometimes overlooked. Often the nucleus of the abducens is affected without giving rise to disturbance of the lateral fixation. This justifies Marburg's opinion against that of Bing.

I cannot judge whether the frequent paralysis of the facial is a paralysis of the nucleus or whether it is owing to a damage of the superficial knee of the facial. It is very remarkable that the isolated paralysis of the muscles provided by the oculomotor were scarcely ever total (Bartels, Bollack), but either a paresis or a muscular asthenopia. In my opinion this is also the case in ptosis and in paralysis of the *facialis*. It might be asked whether among these there are also motor dis-

turbances of the same nature as the extrapyramidal ones. I do not agree with Bartels when he supposes only the nuclei to be attacked, and the cerebrospinal fluid only being the source of infection and this for the following reasons:

1. Cases are known of hemiplegia and hemianopsia.
2. Bollack found disturbances of the lateral fixation (*fasciculus longitudinalis posterior*).
3. It is not certain that there really exist supranuclear centers for the associated movements and the convergence.
4. The diseases of the optic nerve can be well explained only by defects of fibres.
5. Bilateral isolated paralyses of the ocular muscles occur without affections of the nucleus (Meyerhof's case of hemorrhagic encephalitis with bilateral paralysis of the abducens).
6. The long lasting disturbances of the pupillary reflexes without strong dilatation of the pupil plead more for affection of the reflex tracts than for a spasm in the nuclei.
7. The pathologic anatomic researches showed diffuse processes, generally perivascular, so that besides an infection via the cerebrospinal fluid, there also must be accepted an infection via the blood circulation.

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OCULAR MANIFESTATIONS IN ENCEPHALITIS LETHARGICA.

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MILWAUKEE, WISCONSIN.

This paper reports the frequency of the disease recently in Wisconsin. It gives the usual eye symptoms and the histories of four cases. Read before the Wisconsin Surgical Association, May, 1921.

This most interesting disease has been named Encephalitis Ophthalmoplegia; Encephalitis Lethargica; Epidemic Encephalitis and sleeping sickness. It must not be confused with the sleeping sickness of Africa.

The record of the deaths reported in this state during the year 1920 was 26. This year in January there were 4 deaths, in February 13, and an incomplete report for March with 14 deaths recorded.

In Milwaukee twenty cases have been reported since January 1, 1921, with eight deaths. In New York City during the first four months of this year two hundred and eighteen cases were reported.

The ocular manifestations appear early in nearly all instances and are frequently the earliest symptoms complained of by the patient. The ophthalmologist must not overlook the causal factor when the patient complains of double vision or drooping of the eye lids. I believe there are a large number of these cases with us, but the symptoms are so mild and transient that they are not attributed to the encephalitis. Every case should be reported in order to obtain accurate statistics.

The eye symptoms in order of frequency are as follows: diplopia, ptosis, impaired accommodation, nystagmus, sluggish pupils, optic neuritis, papilledema. It is the tendency for the ocular symptoms to result in recovery and therefore the prognosis of eye disturbances is good if the patient survives.

The diplopia, due to motor paresis or paralysis, is of central origin and is usually transient. The nerve involvement in order of frequency is the 6th, 3rd and rarely the 4th. The latter is easily overlooked because it is not seen when ptosis appears or when the pa-

tient is in a stage of lethargy. The diplopia is noted in the distance and in every direction but I have never seen one that complained of this disturbance while reading. The vision is usually normal in the distance as well as for the near. The motility is also preserved in most cases. This symptom is usually the first to disappear, but may recur and affect the opposite eye. The pathology is unknown.

The ptosis is bilateral usually and may be complete but is frequently partial. In the state of lethargy, the lids may be closed and opened with great difficulty. A tremor of the lids is frequently observed in this disease. The ptosis is due to weakness of the levators. Ptosis combined with ocular paresis is rarely met with in any other disease and is pathognomonic of encephalitis lethargica.

Impaired accommodation is manifested by quick fatigue and the emmetrope cannot read even at arms length. This symptom is the last to leave, persisting sometimes for many months. The pupils are frequently sluggish in action and there may be irregularity and inequality, bilateral usually. The pupils in some cases remain dilated and fail to react to light.

The nystagmus may be slight or pronounced. Sometimes merely nystagmoid twitching is seen. The facial nerve is sometimes involved and this usually unilaterally. There is rarely lagophthalmus.

Optic neuritis is manifested by a blurring of the optic disc, probably due to dilatation of the capillaries with resultant congestion of the retinal veins.

Papilledema is a rare condition. I can find only two cases on record and I wish to add an interesting case with particular symptoms in my report of cases. There is probably a subcortical hemorrhage or edema cerebri, or both,

responsible for this symptom. This condition, in every case reported, was unilateral and the same holds good in the case under observation.

The causative organism has been isolated by Drs. Loewe and Strauss of New York, and recently confirmed by Dr. Thalheimer of Milwaukee.

Differential diagnosis must be made between this disease and brain tumor, extradural abscess, meningitis, T. B. or serous, uremia of diabetic coma, lues, cerebrospinal, hysteria.

CASE I. Miss M. W., aged 24. Family history and previous history negative. General condition good. Glasses, worn for myopic astigmatism, bring her vision up to normal. Onset July 7, 1920, with left facial palsy, vertigo and double vision. No fever. Headache slight at rare intervals.

Eye symptoms: Ptosis slight, bilateral; diplopia beyond 15 inches from the eyes, and in every direction. Paresis left 6th nerve, marked from July 7, 1920, to December 23, 1920; when, after an interval of two days, there was a noted paresis of the right external rectus. The facial on the right was also attacked at the same time. Nystagmus horizontal and bilateral to a marked degree. Pupils sluggish and dilated bilaterally. Accommodation decidedly weak. Papilledema was noted on February 1, 1921, in the left eye. The patient complained of pain and a decided fog before the eye. A definite choked disc, amounting to three diopters, was observed by the writer and verified by Dr. Koch. This condition gradually declined until on April 12th, when no edema of papilla existed, and the patient's only complaint today is a blurring of the print in the near.

The neurologic examination was negative. Spinal fluid negative and pressure normal.

CASE II. J. L. Age 16. Three weeks previous to entrance to Hospital (Feb. 15, 1921) patient became dizzy especially on change of position of head, very restless, garrulous and did not sleep at night. Physicians had to prescribe powder to produce sleep. Following this early period of 2 weeks of

excitement, patient became depressed and then later lethargic.

On entrance to hospital patient showed the "indifferent" attitude answering only at time when spoken to. Two days after entrance to hospital when patient was asked a question, response was a series of unintelligible sounds. Patient gradually became worse, lethargy deepened, later passing into coma. Fever was slight on entrance, but gradually increased about 0.3 of a degree each day and suddenly taking a jump from 103 to 106 two days before death and reaching 108.4 just before death. Patient had no headaches, the first symptom being marked dizziness, especially on change of posture. There was some weakness of left side of face.

Eye Symptoms: No diplopia could be elicited. Bilateral ptosis present. Lack of synergic action of eyeballs but no strabismus present. Slight vacillatory movement of eyes, especially to right. Right pupil larger than left. Left somewhat irregular but reacts sluggishly to light. Accommodation unobtainable. Both fundi normal.

Spinal fluid; Wassermann negative; globulin, plus; cultures, negative; cell count 15 on entrance, 180 three days before death; fluid under great pressure, about 180 drops to a minute; fluid always crystal clear.

Family history, negative. Patient lived in Missouri and had malaria. Otherwise past history negative. Extradural abscess was the diagnosis by one of the consultants.

Post Mortem Record, made by Dr. Margot.

No abnormal external appearances of note were found. The scalp and tissues over the calvarium appear normal. The dura was not adherent and was white and glistening. The superior longitudinal sinus was empty. The pia was quite cloudy and opalescent due to marked edema of the left meninges. There were no gross hemorrhages, except very fine pin point in ventricles.

Microscopic examination: Perivas-

cular infiltration of the vessels of the white matter, especially of the caudate and lenticular nuclei, optic thalamus, pons and posterior horns of the cord, edema and miliary hemorrhage of surrounding parts.

CASE III. Mr. C. U. O., aged 24. General condition poor. Family, as well as personal previous history negative. Onset present illness December 24, 1920, with history of blurring of vision and double vision. No fever or headache at any time. Lethargy began Jan. 1, 1921, but not marked, and persisted for about two months. The left facial and also the left arm were paretic.

No history of influenza. The spinal fluid and blood upon examination were found negative.

The *eye symptoms* were: Ptosis bilateral and partial; the left more marked than the right lid. Diplopia

from December 24th, 1920 to January 8, 1921. Paresis of the 3rd, 4th and 6th nerves, of left eye. Nystagmus lateral, bilateral and rhythmic. Pupils sluggish to light and accommodation.

CASE IV. Mr. J. C. N., aged 39. General condition good. Family, personal and previous history negative. Onset present illness December 27, 1920, with nausea and vomiting, at the same time a parotitis with excessive salivation was present. No fever or headache. Lethargy not present. The man was able to keep up his work. No history of influenza. The spinal fluid and blood were negative.

The *eye symptoms* were as follows: Ptosis partial, left lid especially. Diplopia due to pareses 4th and 6th nerves left side. Nystagmus, horizontal and bilateral. Pupils irregular and somewhat sluggish to light and accommodation.

THE BARRAQUER INTRACAPSULAR CATARACT OPERATION

A. S. GREEN, M.D.,

SAN FRANCISCO.

AND

R. PACHECO LUNA, M.D.

GUATEMALA, C. A.

This paper records impressions gained from a visit to Professor Barraquer's Clinic at Barcelona. The immediate and later results of his operation were observed. His use of vibration to loosen the lens from the suspensory ligament and his difficulty in getting instruments perfectly adapted to the purpose are stated.

The intracapsular cataract operation has evoked a great deal of discussion and criticism during the last decade. While a few modifications of the Smith-Indian technic have appeared from time to time nothing of great importance had been devised until Barraquer of Barcelona published his first paper upon phacoerisis.

In order to judge the value of this method, we spent eight days in Barcelona with Dr. Barraquer and during that time he showed us a series of operations and took great pains to demonstrate to us the details of the technic and the mechanism of the erisiphake. He also gave us the privilege of examining the patients before and a few days after the operation, as well as a number of cases that had been operated upon as long as three to four years prior.

As we saw the operation in Barcelona, the method consists of the production of a vacuum by a special electric motor, causing a very small cup to adhere to the anterior capsule of the crystalline lens; and the simultaneous transmission of vibrations to the fibers of the zonula. Barraquer attaches a great deal of importance to those vibrations as he claims that they rupture the fibers of the zonula, thus permitting the extraction of the lens with the least possible traction upon the ciliary body and without pressure upon the eye; and it is this absence of marked traction and pressure which makes this operation superior to the other intracapsular modifications.

Rules can not be formulated at present, as to the amount of vacuum and number of vibrations necessary in each case, as that is the result of practice

based upon a very careful examination of the patient. The knowledge thus gained serves as a guide to the amount of vacuum and the number of vibrations to be developed in each individual case; thus the harder the cataract, the greater must be the vacuum and the larger the number of vibrations produced, to put the capsule on sufficient tension and facilitate the rupture of the zonula. Conversely the softer cataracts require a smaller amount of vacuum and fewer vibrations.

It is to be regretted that until now the proper instrument has not been obtainable. This is due to the fact that Barraquer has been constantly perfecting it, and also to the difficulty in getting artisans sufficiently skillful to make an accurate instrument. It is true that some instruments have been sold but they were not with the approval of Barraquer who recommends only those obtained from Cusi which are tested personally by Barraquer before they are put on the market. The operating results with other makes were not satisfactory, and this gave rise to a difference in the results obtained by other operators.

Of the operations that Barraquer performed in our presence, there was loss of vitreous once, and the amount was very slight; when the toilet was completed, the pupil was round. When the patient was seen upon the first dressing a few days later, there was practically no reaction, the wound was apparently healed and the pupil round. In another patient, the capsule ruptured and the operation had to be continued as in the capsulotomy method, the lens matter expressed; and very little cortex was left behind. The re-

sult was in no way different from the ordinary capsulotomy operation with forceps. The patients were not selected as there was one diabetic and another nephritic. Some of the cataracts were immature and one was Morgagnian. Before the vibrations were incorporated in the instrument, Barraquer had cases of intraocular hemorrhage. But since then he has had no hemorrhages.

After completing the toilet, eserin salve is applied between the lids, both eyes are bandaged and the patient walks to his bed. In private practice, the patients are operated upon in his office and are allowed to go home immediately afterwards, as Barraquer does not fear prolapse of iris or loss of vitreous. The comparative freedom from a tendency to iris prolapse and loss of vitreous he explains in this way:

In contradistinction to those cataract operations dependant upon expression of the lens, his operation is one of extraction after the fibers of the zonula have been broken. Thus there is less tendency for an outflow of the intraocular contents, than would be the case with other cataract operations.

CONCLUSION.—The Barraquer operation impressed us very favorably, and perhaps with slight modifications by the originator, will probably become the operation of the future, for of all intracapsular operations, this appears to be the safest. But it must not be thought for one moment, that it is an operation for an amateur to undertake. In the first place a proper instrument is essential; and in the second place the highly developed skill and technic that is required in all cataract operations is even more necessary in this.

A SIMPLIFIED INTRANASAL OPERATION FOR OBSTRUCTION OF THE NASOLACRIMAL DUCT

R. H. GOOD, M.D.

CHICAGO, ILL.

In this operation the inner bony wall is removed over both the lacrimal sac and duct, and both sac and duct are opened. Five illustrative cases are given. Read before the Chicago Ophthalmological Society, March 21, 1921.

There have been published a great many intranasal operations on the lacrimal sac and nearly all attempt to make an artificial opening from the lacrimal sac into the nose. These openings have a natural tendency to close. They do not restore the normal function of the nasolacral duct and all of them require considerable skill to perform.

Yankauer on the other hand has devised an operation resecting the mucous membrane from the anterior end of the inferior turbinate, removing the inner bony wall of the lacrimal canal, incising the duct and thereby restoring the normal function of the duct.

To my mind, if we use any surgical procedure which does not attempt to restore the normal function of the duct we have failed to do our full duty.

The reason why the nasolacral duct becomes obstructed so frequently is because it is surrounded by a bony wall, and whenever it becomes inflamed it cannot expand sufficiently on account of the bony wall. This bony barrier acts the same as the skull in intracranial pressure, due to edema of the brain, which can be relieved only by decompression. The bony wall of the lacrimal canal acts the same as an irritant to inflamed ducts and thus produces a chronic inflammation in the nasolacral duct. This is the reason why probing the duct does not give us the results which we naturally would expect. Merely removing the inner bony wall of the duct and slitting the membranous duct is not always sufficient to establish a cure in suppurative cases. I have found that by removing the inner bony wall over the duct and lacrimal sac, slitting the sac as well as the duct, gives better results. By doing so we allow the sac to drain

above, while the duct is healing and eventually the duct functions and the opening in the sac closes leaving a normal functioning lacrimal apparatus.

An artificial opening from the sac into the nose does not drain the tears as well from the eyes as a normal lacrimal apparatus because in the latter the gravity of the tears in an inch and a half tube facilitates drainage.

The object of this paper is to present a simplified intranasal operation on the lacrimal sac and tube, which can be readily performed by rhinologists and ophthalmologists.

The nose is thoroly anesthetised with adrenalin and flakey cocain. The lower canaliculus is dilated and with a syringe a few drops of a 10 per cent solution of cocain in adrenalin are introduced into the sac. In nervous patients it is wise to inject the infraorbital nerve with novocain and administer 1/4 gr. of morphin hypodermically one-half hour before operation. I have occasionally injected novocain between the sac and the lacrimal bone as well as into the lacrimal groove.

The anterior end of the inferior turbinate is removed with bone forceps as close as possible to its attachment and just beyond the duct opening. A grooved lacrimal probe is now introduced thru the lower canaliculus and passed thru the nasolacral duct into the inferior meatus of the nose. The probe should be as large as can be passed without force and without injury to any structures. An incision thru the mucous membrane is made from high up just in front of the middle turbinate down to the edge where the inferior turbinate has been removed terminating just anterior to

the probe. The membrane is elevated forward and backward which makes two triangular flaps with the apices above. A special nasal chisel hollowed out with dull corners is placed at the anterior crista of the inferior turbinate as illustrated in Fig. 1. About $\frac{1}{4}$ of the circumference of the bony wall is chisled away. The anterior portion of the lacrimal bone and the posterior portion of the frontal process of the superior maxillary bone have a depression on the orbital side in which lies the lacrimal sac, and the depression causes a bulging or convex elevation in the nose over the sac which makes

much less trauma than the removal of a section of the sac; and if the incision is long it drains better and there is no danger of cicatricial contraction of the sac.

Nearly all the operators who advocate making an artificial opening from the sac into the nose speak of after treatments being required, such as caustics to destroy granulation and frequently passing a probe to keep the opening open. It is my opinion that if it is necessary to use caustics and probes after operating our chances are very slim to establish permanent drainage. It is very common after the



Fig. 1.—Special chisel in position to remove inner fourth of bony wall of nasolacrimal canal.

it easier to chisel. This elevation of bone is chisled off up to about the middle of the sac. A small crow-beaked knife is now placed into the groove of the lacrimal probe, Fig. 2, and the duct and half the sac incised. The flaps readily fall into place and the operation is completed. There is no after treatment required. By using a chisel, instead of bone forceps, we avoid injuring the membrane duct, and a larger section of the bony canal can be removed and one can always have the lacrimal probe for a guide. By biting off the anterior end of the inferior turbinate we can do no harm to the duct. The flaps do not need to be sewed as they remain in place. A longitudinal incision thru the sac causes

pseudoopening operation to find the patient blowing air and mucus into the eye when blowing the nose. I have not observed this in any of my cases. It has been a common practice for years to slit the canaliculus in cases of dacryocystitis, but this practice is hitching the horse to the wrong end of the wagon. An eye with a slit canaliculus never looks normal nor drains the tears as readily as a normal canaliculus. It is my opinion that this should never be done except in lesions in the canaliculi or upper portion of the sac. Some operators describe the slitting of the inferior canaliculus as a part of their procedure in doing an intranasal operation on the sac. This destroys the capillary action of the

canaliculus and makes the gravity of the tears practically nil as the distance from the artificial opening in the sac to the common opening of the canaliculi is extremely short. Dr. Mosher says that all intranasal measures face danger of reclosure of canal and are only a temporary success, and that frequent probing and the wearing of styles is necessary. I have not failed thus far to restore the function in any case that I have operated and I have not carried out any after treatment whatever except the use of a few drops of adrenalin 1-20000 in the eye morning and night and occasionally injecting a

Was obliged to do a submucous resection. Chisled away bony wall of lacrimal duct on either side before I could pass the probe and use it as a guide. Operated both ducts and septum, 6/13/19.

CASE II. Mr. W. B., age 22, Milwaukee, Wis. Sent to me by Dr. D. Fiske. Was struck by a coal shovel in one of the navy boats fracturing superior maxilla on both sides causing dacryocystitis on each side. Could not pass probe into nose on either side. Operated left side, 10/10/19.

CASE III. R. J., Chicago boy, two years old. When eight weeks old baby



Fig. 2.—Crow-beaked knife in groove of lacrimal probe to incise the lacrimal duct and lower half of the sac, after removal of bony wall.

little argyrol into the canaliculus with a syringe to demonstrate to myself and to the patient that the argyrol comes out thru the nose. The following five cases were the most difficult I have encountered thus far:

CASE I. Mr. H. A. D., age 25, Marshfield, Ill. While a truck driver in France during the war had a collision and fractured his superior maxilla on both sides and also fractured the nose. Since that time his eyes were inflamed and teared constantly. He could express pus into the eyes by pressing on the tear sacs. Probes could not be passed into either inferior meati. Septum was crushed and was thickened so that the nose was obstructed in front.

had a fall and ever since has had a suppuration in the right lacrimal sac which caused the right conjunctiva to be continuously inflamed and the upper lid drooped somewhat. On account of the small nasal opening I had to do most of the operation by sense of touch.

CASE IV. Mr. H. G., age 38, Chicago. Sent to me by Dr. Chas. Goldberg. Patient says four years ago a barber accidentally dropped some lotion into his right eye, which caused a marked inflammation of eye with a reddened area over the region of the sac, but this disappeared. A few years later a reddened pimple appeared over the sac but disappeared. Last December patient developed an acute plegmon of

the right lacrimal sac which ruptured leaving a persistent fistula. Mar. 13, 1921, performed operation. Could not easily pass lacrimal probe thru canaliculus on account of congestion so I used the fistula instead. About two drams of pus were expressed from the fistula before starting to operate.

CASE V. Mr. F. J. R., age 35, Chicago. Sent to me by Dr. Earl B.

Fowler. Has had chronic dacryocystitis of left eye for many years. Has been probed and washed out many times without benefit. There was considerable swelling and infiltration so that the tissues felt rather hard to touch. Pus could be squeezed out by pressing sac. Operated 4/20/20 and in two weeks the patient's appearance was normal and the sac functioning.

SUBCONJUNCTIVAL DISLOCATION OF THE CRYSTALLINE LENS.

GEORGE C. ALBRIGHT, M.D.

IOWA CITY, IOWA.

This is the report of a case in which with very little reaction the crystalline lens seems to have become dislocated beneath the conjunctiva; subsequently without exciting much discomfort it escaped thru the conjunctiva and was removed thru the lower culdesac. The sclera had become previously thinned by glaucoma. The patient was one who made much less than the usual complaint of any form of discomfort.

In view of the apparent rarity of subconjunctival dislocation of the crystalline lens, and the still further rarity of subsequent spontaneous or traumatic expulsion of the lens from beneath the conjunctiva, it might seem that the following case may be of interest to ophthalmologists.

Mrs. E., age 70, first consulted me in May, 1918 for some nasal trouble. The history given indicated and the findings showed that she was suffering from an old atrophic rhinitis. I had known the patient for years in a social way, and knew she had had considerable trouble with her eyes. The history of the eye trouble was not elicited until some two years following the above date. The patient had sufficient vision to get about, attend to her housework, go and come for short distances by herself. Her eye trouble had extended over a period of several years and at this time she was still under the observation of a competent ophthalmologist. Knowing this, I did not question her regarding her eye trouble nor make any examination, my whole object being to make her more comfortable by caring for her nasal condition. At intervals during the year 1918 she consulted me for palliative treatment of the nose for the crusting and the discharge which were at times quite annoying. I did not see her during the year 1919.

On February 14, 1920, she came to my office complaining of some trouble with her left eye. She stated that while at work about ten days previous she had noticed a little tenderness in the left eye, but no real pain. The trouble began, she thought, when she accidentally struck the eye with her thumb or finger temporo-inferiorly. The eye

seemed to pain her a little at that time, but nothing acute, no redness. Since that time it had felt as tho there were a foreign body in the eye, but no attempt had been made to remove it. The right eye was artificial.

Examination of the left eye: The temporo-inferior portion of the iris is obliterated except for a very narrow margin temporally. The iris is tremulous, the entire iris is misplaced, the pupil being to the external inferior part of the iris, approximately seven millimeters in diameter, altho very irregular in outline. A thin band of iris, four millimeters wide at its base and two millimeters at its apex, extends downward across the pupillary opening and is attached at its apex behind the margin of the iris, temporo-inferiorly. The pupil is clear black each side of this band. Surrounding the cornea, the sclera is clear, attenuated for a distance of two or three millimeters. Just external to the limbus and inferior to the horizontal meridian, there is a pigmented scar about four millimeters long, apparently scleral. At the outer end of this scar there is a small elevation of the bulbar conjunctiva which is filled with spots of scattered black pigment. This same pigment was found along the entire length of the scar.

Right in the inferior fornix there was found a dark yellow lenticular shaped mass about four millimeters in diameter, perfectly free from all attachments and which was readily lifted out with a cotton tipped probe. No evidence could be seen of the scleral scar from the fundal aspect. No evidence of the lens could be seen in the vitreous. Diagnosis at that time was made that the lens had been extruded thru the sclera and conjunctiva.

The mass secured from the fornix was submitted to the pathologist for examination, who returned a report that the mass was microscopically a cataractous crystalline lens.

Following this, I secured from the patient's daughter the following eye history. It should be said that the daughter had lived with the mother constantly and cared for her, also that the daughter had worked for years in the office of an ophthalmologist, consequently her history would be more accurate than the usual one.

The history that she gave me without my questioning her at all, was as follows: Her mother had been troubled for probably thirty years with eye trouble, said to be secondary to tooth trouble. Early in her acute trouble the right eye was enucleated, fearing sympathetic trouble in the left eye. The condition in the right at the time of its enucleation she did not know. About twenty years ago the patient had had a downward iridectomy in the left eye for glaucoma. Following this, the vision improved for about one year, when it began again to fail and the patient was told that a cataract was developing. The cataract progressed very slowly and without any increased glaucoma. The surgeon expected, so the daughter understood, to do a combined cataract extraction and trephining operation.

In December, 1916, after twelve years or more of waiting, the vision had become so bad the patient could only tell light from dark. At this time, one day when stooping over she accidentally struck her left eye against a brass knob of a bed post. The pain was only slight, but the daughter noticed blood in front of the iris. The patient was immediately removed to the hospital where she remained for weeks under treatment, but with no operative interference. When ready to leave the hospital the patient could see very much better. The surgeon told the patient and daughter that the cataract had been dislocated backward, to the outer side and below, and advised no active treatment. During the past

four years the eye has been quiet and the degree of vision about stationary as above noted.

The past year, the daughter states, she had noticed a small yellow lump beneath the conjunctiva inferior and just outside the limbus. Lately she had noticed this lump was gone. She made these observations and gave the above history before being told of finding the mass in the fornix, above mentioned.

The patient has since passed away, result of a cerebral hemorrhage. No postmortem examination of the eye could be made.

In the light of the history and our findings, we must conclude that following the traumatic dislocation of the lens in December, 1916, the lens has rested against the sclera in an approximately fixed position. Owing to the glaucoma, the sclera had become greatly attenuated in the region of the limbus which is, as is well known, the weakest part of the sclera next to the optic disc. Either some very slight traumatism or perhaps a gradual softening had caused the cataractous lens to be extruded thru the sclera beneath the conjunctiva, carrying with it small bits of the choroid which later pigmented the scar. As a result of the very slight injury received in February, 1920, the lens was extruded thru the conjunctiva where it remained in the fornix until removed.

Fuchs, de Schweinitz, Roemer, Zentmayer, mention the possibility of traumatic subconjunctival dislocation of the lens. The case which I have reported cannot be definitely said to be traumatic, but is more probably traumatic than spontaneous. The patient's general tonicity was the lowest that I have ever seen and her reaction to trauma or irritation about the slightest. This might account for the ease with which the lens was extruded thru the sclera and would certainly have a bearing in explaining why the lens mass would remain in the fornix as a foreign body for the week or ten days

after its expulsion thru the conjunctiva.

To illustrate this low tonicity and slight reaction to irritation I might cite an incident which had no direct bearing on the eye condition but is interestingly illuminating. A few months after the eye trouble in February, I was called to see her at her home. She stated that while spraying her throat with a DeVilbiss atomizer, the acorn tip had fallen off and that she believed it was lodged somewhere in her throat.

Altho it was four hours since the accident, she was apparently suffering no inconvenience except for a feeling of something in her throat. Taking a wooden tongue depressor and pressing the base of the tongue forward, the tip of the atomizer was seen resting in the pyriform recess to the right of the base of the epiglottis, from whence it was easily lifted out by means of a small Hartman's nasal dressing forceps.

NOTES, CASES AND INSTRUMENTS

A POINT IN THE TECHNIC OF IODIN TREATMENT OF CORNEAL ULCERS.

HAROLD GIFFORD, M.D., F.A.C.S.
OMAHA, NEBRASKA.

Tinctur of iodin is useful in torpid corneal ulcerations especially of the herpetic or dendritic variety. In its ordinary form, however, it is difficult to use both effectively and carefully, because it evaporates so quickly that unless the application be made with reckless rapidity, the swab is apt to become so dry that it produces no effect.

To meet this difficulty, I have put ten or a dozen iodin crystals into a 10-15 drops of the ordinary tinctur, keeping it in a small bottle. I have found that the syrupy liquid thus produced is free from the objection first mentioned, besides being more effective.

Where a less concentrated tinctur is desired, the difficulty can be met by adding 5% of glycerin to the ordinary tincture as suggested by my friend and former assistant, Dr. R. C. Person, now of Maryville, Mo. With either of these forms of tinctur, the iodin can be applied with the same care and thoroughness that is possible with trichloracetic acid.

AN ILLUMINATED TEST-CARD HOLDER FOR NEAR.

ALFRED COWAN, M.D.
PHILADELPHIA, PA.

The value of testing the visual acuity for near as well as for far depends on an even illumination of the test object. Cards at a distance being fixed, the intensity of the illumination is always the same.

The near test object must necessarily be so arranged that it may be placed at different distances from the patient and the intensity of the illumination is changed unless the source is made to follow the object. This is accomplished by the device illustrated—

a test-card holder containing the light. The construction is admittedly crude and one mechanically inclined may suggest some improvements and modifications. It consists merely of a 10 watt lamp enclosed in an opaque shade with a ground-glass covered slit

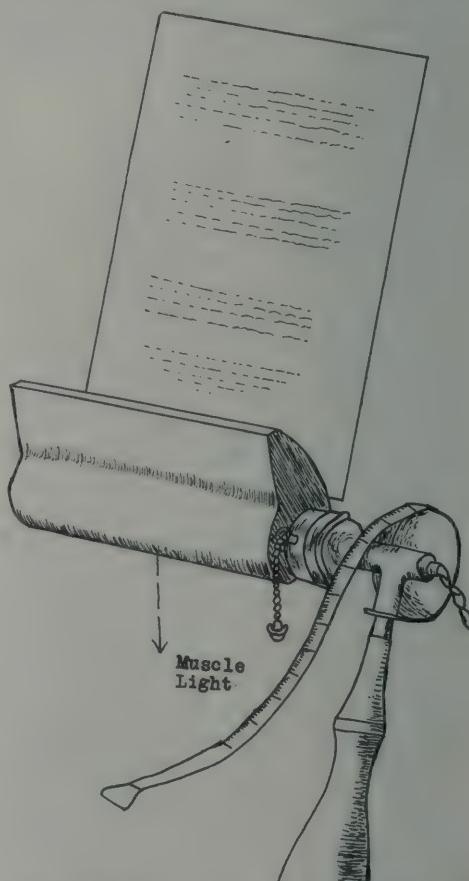


Fig. 1.—Illuminated test-card holder for testing near vision. (Cowan).

thru which the light is thrown on the card. It is connected by a cord and plug to an ordinary outlet. Any test type or other object may be used.

On one side is a compact one meter tape with a spring roller for measuring the reading distance or the near point.

Beneath and slightly behind there

is drilled in the shade a one millimeter opening, so that by elevating the handle, which is to one side, a convenient light is had for making muscle tests.

The back is so arranged that it may be hung on the wall when not in use.

This holder seems to combine in compact form all near tests and being held thruout by the patient, the operator has both hands free.

A MAGNETIZED KNIFE TO EXTRACT SMALL MAGNETIC FOREIGN BODIES FROM THE ANTERIOR CHAMBER.

JAMES M. PATTON, M.D.
OMAHA, NEBRASKA.

In extracting small magnetic foreign bodies from the interior of the eye by the corneal route, I remember on one occasion having difficulty due to the foreign body's becoming pinched in the iris angle as a result of a slight loss of aqueous on making the corneal incision. It has been our custom to use the inner pole or ring magnet of Mellinger as well as our giant magnet. The patient is able to lie comfortably on the operating table with the ring arranged in such a way that the injured eye is as near its center as possible. The soft iron "electrode" becomes strongly magnetized on approaching the center of the ring and the traction on the foreign body can be controlled to a nicety. This is most important in teasing a small foreign body around the pupillary margin of the iris into the anterior chamber. The tips of the "electrodes" can be of various shapes and sizes, either relatively large, which gives stronger traction, or small and delicate for use in the lips of small incisions.

Recently, while attempting to extract a small foreign body from back of the iris, I had drawn it around the pupillary margin into the anterior chamber and, as is our custom, prepared to make my corneal incision without removing the ring from the patient's head. My assistant failed to turn off the current when I made my incision and I was much gratified to

see the foreign body move quickly to the point of the knife and remain in that position after the knife was removed, apparently adhering to the lips of the wound. It was then easily removed with the "electrode" of the inner pole magnet. I have tried this repeatedly with very satisfactory results. It is possible to remove the foreign body in this way with practically no loss of aqueous.

When using the giant magnet, a Graefe knife can be magnetized by placing it in contact with the tip of the magnet for a few minutes. It is then sufficiently magnetized to attract the foreign body, altho not so strongly as when used in conjunction with the inner pole magnet.

BILATERAL DISLOCATION OF CRYSTALLINE LENS, REMOVAL.

W. G. PUTNAM, B.A., M.B., C.M.
YARMOUTH, N. S.

F. L., 48. Fisherman, small farmer. A large fat man, weight 275 pounds. Has consulted me several times previously for failing sight. Family history: Father blind for years, result of chronic glaucoma. One sister blind from same cause, her physician not recognizing the trouble. One brother living in the U. S. A. blind presumably from same cause.

Refraction record:

Sept. 3, 1905. R. 5/200 with—13.00—
20/120. L. 9/200 with—9.00—20/200.

Aug. 1, 1906. R. same. L. 7/200.
with—9.00—20/200.

On June 19, 1909, he came to see me, saying that his glasses had quite gone back on him. He had noticed this directly after a severe fall backwards, which had almost rendered him unconscious. Examination showed dislocation of both lenses, the right upward, the left downward, with moderate dilation of pupils.

On the morning of July 4, 1909, he came to my house to tell me that his wife had noticed something strange in his left eye two days before. I found the left lens in the anterior chamber. We had no hospital at that time, so I

advised him to go to Boston, Mass., the next day, the earliest possible, for treatment. Next morning he began his work as usual, but very soon was taken with an intense pain in his left eye and seen by his regular physician, who found him nearly crazed by pain, pulse 36, temperature 98.6° , and the eyeball very hard. He was given morphin sulphat, gr. 1/4, hypodermically and when I saw him at his home in the country, two hours later, the pain was much easier and pulse was 56. I found the eyeball very hard T+3 at least, the lens pushed forward close against the cornea, its periphery covered by the iris which was "ballooned" forward. Under cocaine, in about half an hour, the iris dropped back and the margin of the lens was free, so I decided to attempt removal of the lens. I made a good upward section, practically at or just behind the corneoscleral junction and at once there was some escape of watery vitreous as was to be expected. I tried in various ways to remove the lens by pressure, loop spoon, hook, but every effort brought more vitreous. I finally got a hook engaged and thought the lens was coming, but it slipped off and dropped back into the vitreous. In view of the very acute glaucoma present, and influenced in part by the family history, I did a wide iridectomy, bandaged the eye and gave a gloomy prognosis. However, apart from some pain, everything went on nicely, and a month later a traumatic cataract was to be seen. Later on this began to be absorbed and there being no nucleus, complete

absorption resulted by March 10, 1910. V.+7.00=20/70. On Sept. 14, 1911, he came to see me again, this time the right lens was in the anterior chamber, having been noticed the previous evening by his wife. Next morning, thru a section similar to the one made in the left eye, I was able to remove the lens, with only a trifling loss of vitreous. The after history was uneventful.

Vision Oct. 31, 1912. R.+8.00=20/30. L.+6.00=20/40.

I have seen the patient many times since. In June, 1917, vision was the same, and I often see him driving around, and he says there is no apparent change. August, 1920, Dr. S. W. Prowse, F.A.C.S., of Winnipeg, saw the patient and can vouch for results as given.

April 8, 1921, the man was found dead in a field near his home. I knew he was suffering from some cardiac lesion, but, of course, was not looking for his death so soon.

The points of interest to the writer were: 1 family history, 2 progressive myopia under observation years before the accident, 3 partial dislocation of both lenses, due to indirect violence, 4 further dislocation into anterior chamber, with interval of over two years, 5 operative result. There are certain features in the case I do not quite understand. What became of the lens capsule? Did I remove the lens in its capsule? This case was seen before we had a hospital here and both operations were done at the home of the patient some miles in the country.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

NETHERLANDS OPHTHALMOLOGICAL SOCIETY.

Fifty-fifth Meeting.

G. F. ROCHAT, in the chair.

Translated from the Tidschrift v. Geneeskunde, by E. E. Blaauw.

Angiomatosis and Exudative Retinitis.

H. J. MEYLING demonstrated a case of angiomatosis retinae of von Hippel, in a rather advanced stage. A second patient with the exudative retinitis of Coats showed clinically much similarity with the first one. Meyling agrees with Berg that even if these diseases can be distinguished in the beginning, in their further course clinically and pathologicoanatomically the differences disappear.

Lashes in Anterior Chamber.

A third patient is a young girl who was wounded with a steel writing pen 15 years ago. Directly afterward the points of the pen were extracted from the cornea with an eyelash, which these held clasped. After months, when the blood was resorbed from the anterior chamber, there could be seen two eyelashes in fibrin on the anterior lens capsule. They are still visible and show loss of their pigment and fibrillary decomposition, without the slightest irritation.

Tumor of Anterior Chamber.

W. P. C. ZEEMAN showed a stereophotograph of a mother-of-pearl-white epithelial tumor in the anterior chamber of a boy, where a year previous a fork had penetrated the cornea. After removal the tumor appeared to originate from implanted eyelashes. 2d. the sections of an eye, which was removed some weeks after a serious penetrating wound, and where in the scar tissue, which had formed from the cornea in the vitreous cavity, were visible the sections of an eyelash, surrounded by giant cells, between the lens and ciliary body.

Metastatic Sarcoma of the Eye.

G. TEN DOESSCHATE observed a patient with the above condition; and one who showed a similar tumor of the retina.

The first patient was a 47 years old woman, who was admitted because she saw badly with O. D. since some weeks. V. was $<1/60$, T. = 15 mm. O.S. had a T. = 20 mm. and normal V. O. D. showed detachment of the retina, with negative transillumination.

After some 5 months she returned with severe pains, which had lasted 6 days. There was secondary glaucoma, T. = +1, negative transillumination, fundus invisible. Patient was much emaciated and showed multiple bluish-black nodules in the skin. These tumors were not painful, grew rapidly and are little adhering with the surrounding. In both axillae there were glandular swellings, the liver was not painful, but a little hard. The patient had strong melanuria.

Three days after enucleation, the patient suddenly saw badly with O.S., 6/60. A retinal detachment was present, with a blackish tinted margin; transillumination negative. After 7 months she was readmitted on account of severe pains in the legs, for a week swollen feet and is very weak. Many dark nodules in the skin. Very frequent heart sounds. In the superior external quadrant of the fundus was a large circumscribed tumor visible, which covered the disc partially. V. = O, T. = n. Some weeks later she succumbed under symptoms of general poisoning.

In a tumor from the upper arm, markedly, pigmented zones alternate with places with only a few pigment cells. A connection between the distribution of the pigment and the blood-vessels cannot be determined. In the dark spots nearly all cells are filled with pigment. The tumor in O. D. penetrates the papilla and its lamina

cribrosa. Some pigment cells are found in the optic nerve and its sheaths. The tumor has a very striking resemblance to that of the arm. The tumor of O. S. has grown in the papilla and covers a third of it. Some pigment cells have penetrated the papilla; in and between the sheaths of the optic nerve a layer of pigment cells is present.

Ten Doesschate considers it most probable, that a primary melanosarcoma had formed in O. D. This has produced metastases in the entire body; and in the choroid of O. S. In favor of this are the similar texture of the different tumors, and the fact that the affection in the second eye could be followed with the ophthalmoscope from its beginning, after the removal of the first eye.

The second case was that of a 50 years old lady, who had a congenital pigmented nevus below the right mamma; which had begun to grow in 1914 and was then removed. It was shown to be a sarcoma. Three years later symptoms of iritis and glaucoma appear in O. S. An intraocular tumor was diagnosed. The evening before the expected removal the patient had an apoplectic attack and remained unconscious during some days. A brown tumor, behind the iris at the temporal side was seen. O. D. was found normal; V. = 5/5. In the neighborhood of the macula was a small flat, white and black speckled focus. The vision of O. D. afterwards became suddenly worse (2/60); vitreous opacities and multiple white and black foci were seen. Before death the tumor had proliferated thru the iris and pressed the posterior surface of the cornea. Vision O. S. = 1/300. Tension O. S. = ± 1 . Fundus invisible. It became harder and more painful; trephining did not help. In O. D. the vitreous opacities markedly increased. Metastases in the skin appeared.

The tumor in O. S. consists of a loose tissue of spindle, round and polygonal cells, with none or few pigment granules. Between these, pretty regularly, large round and oval cells, entirely filled with brown pigment. Only few

vessels. O. D. shows 5 separate tumors; one large brown tumor in the macular region, the others at the equator. The large tumor posterior in the eye lies entirely in the retina. Both layers of the retina are separated by a blood mass, in which is dark tumor tissue. The center is tumor tissue, which has replaced the inner part of the retina, in which are numerous blood spaces covered with endothelium. The choroid seems entirely free from tumor tissue. The inner retinal surface is dotted with pigmented cells, or coagulations including pigmented cells. Also in vitreous and anterior chamber are pigmented cells. On the surface of the disc are cells with brown particles (= leucocytes, which have taken up pigment granules?). The equatorial tumors lie largely in the inner retinal layers. It seems as if they had originated by implantation.

The nevus below the mamma became sarcomatous and formed metastases in the brain, uvea O. S. and retina O. D. This is the first case of true retinal metastasis of a tumor from outside the bulb.

Conjunctival Secretion and Culture Experiments with Trachoma.

Miss J. M. Kooy looked specially for the Prowazek inclusions, which she demonstrated. They were found except in a few very old cicatricial trachomatous cases. Besides the changes in the cell she found free initial and elementary bodies. Five times she succeeded with cultures in which these formations were refound and where-with she demonstrates that these inclusions are to be considered true organisms, and not simple cell products. She gives the results of an investigation of the resistance and different other particulars of the organisms, and demonstrates the different forms, which she considers to be developmental stages of the same organism. She also mentions the different forms in the clinical forms of trachoma.

DISCUSSION.—De Klejn asked for the representation of the developmental cycle.

Miss Kooy saw many Prowazek bodies in the acute forms, but in older cases chiefly elementary bodies. She considers these latter very resistant. Extracellular forms she found chiefly among the non-Jewish trachoma patients. Probably the true Prowazek bodies are the most contagious. She believes that trachoma in apes is proven.

Pressure During Syringing of Lacrimal Canal.

G. F. ROCHAT mentions that epiphora can be present with a patent lacrimal canal. It is impossible to guess the pressure during syringing, as an Anel syringe is not perfect. The pressure can only be estimated with a manometer. The fine canula of the Anel is put in the inferior canaliculus; which is in contact thru a rubber tube with a glass vessel in which is fluid. This fluid column is raised gradually and the fluid is also given opportunity to escape; so that the moment is found when the first drop appears in the nose. Not the normal force, wherewith in normal circumstances the tears are driven into the nose is investigated; but the pressure necessary for syringing under the abnormal relations, which arise from the experiment (stretching of the canaliculus, uncertainty where the end of the canula lies).

However, the result was the same in all cases, where the condition of the lacrimal canal was normal. Water appears in the nose when the fluid column becomes 25 to 30 centimeters higher in the vessel. When one begins with a much higher pressure, as 60 cm. water, and reduces this column, then drops still come out the nose at a pressure of 15 cm. Once filled, the lacrimal canal seems to act as a siphon.

In these investigations a correction must be made for the resistance in the narrow canula of Anel. If the fluid escapes freely thru the canula a fluid column remains of about 8 cm., which is kept in equilibrium thru the resistance in the canula. This amount must therefore be deducted from the values found and the result is reached, that

the pressure necessary for syringing the normal lacrimal canal is about 17 to 22 cm.

Now the pressure usually exercised was to be found. The Anel syringe with the fine canula was connected with the manometer, in which the level was gradually raised, while the piston, against the water pressure, was pressed inward. With a pressure of 60 cm. in the manometer the syringe did not produce a sensation of abnormal resistance. Hence a pressure is easily used with the syringe which is three times greater than necessary. Patients, who complained of epiphora, and where the rhinologist could not find any abnormality, were examined with the manometer and a higher than normal pressure was found; so that altho the syringing succeeds, still a narrowing of the passage could be demonstrated.

DISCUSSION.—De Kleijn mentions the experience, that the West operation is not successful in the cases of epiphora, where the syringing with Anel succeeds. If it now appears, that in these cases there still was an obstacle, then the stenosis must be in the canaliculus.

Visser saw much benefit in such cases from slitting the canaliculus, which speaks in favor of this hypothesis.

Rochat was not yet able to examine with his method, the cases which had failed with the West operation. He has the same experience as Visser. Blok saw the same: with readaptation the epiphora reappeared, and stopped with reopening.

Wibaut asked if Rochat probed these less passable passages.

Rochat was friendly toward sondage.

Van der Hoeve mentions that success of slitting the canaliculus does not prove always, that this was strictured; it also helps with slight eversion. Reilingh advocates linear cauterization of the conjunctiva in eversion.

Myopia in Semidarkness.

F. WIBAUT mentioned the communication of Baraneck and Verrey in 1893, who had found that all eyes in the

dark have a refraction of $\frac{1}{3}$ to $\frac{1}{4}$ D. stronger. This phenomenon remained under atropinisation, and could be found skiascopically and in the upright image. Charpentier mentioned in 1902, that myopes become more myopic in the dark. He found for himself 2 D., among others 0.5 to 1 D., sometimes even 3 D. These investigators concluded independently that the light produces a stronger filling of the choroidal vessels. The disappearance of this in dark produces recession of the retina with consecutive myopia. Schoute in 1903 could not demonstrate this for himself.

Wibaut could prove it clearly for himself, but Prof. Zeeman could not find any difference of refraction in his atropinised right eye with maximal or minimal illumination and with dark and light adaptation.

Experimentally it was found that the refraction began to increase with an illumination of 0.66 meter candles, when V. was 6/18, and increased to 1.5 D. with an illumination of 0.11 m.c. with V. = 6/38 to 6/12. The impression arises that with the weakest illumination fixation is not strictly central. The phenomenon begins within the first minutes of dark adaptation, increasing during some minutes to remain constant with further dark adaptation; only during longer adaptation the observation is somewhat more difficult. The accommodation has no influence, also the larger pupil in dark does not explain.

The explanation is partly found in the phenomenon of Purkinje. This exists also for the fovea (Hering). If it is considered too small in the fovea for having an influence, it must be remembered that the myopia was the strongest with illumination, whereby the fixation was not more central, and here therefore the parafovea also functions. If the eye becomes more sensitive for the stronger refracting rays with these low illuminations, it will explain that this can change the refraction. Theoretically a difference of 2 D. can be computed between the refraction of the extreme red and extreme violet rays. Practically Wibaut could demonstrate for himself and others a difference of

0.75 to 1 D. His refraction is in daylight E.—0.25, with a red filter E.—0.25, with a green filter E.+0.25, with a blue filter E.+0.75. His usual refraction in daylight can therefore be called his "red refraction." Monochromatic light in the dark gave similar results, altho the myopia was only partly present. To explain this he refers to the investigations of Ogata and Weymouth (Amer. Jour. Oph., Sept., 1918): the deeper situation of the parafovea in some people.

DISCUSSION.—Kröner asked if the dispersion circles with weak illumination, which can be observed, are perhaps smaller. Wibaut does not think this probable, because weak positive lenses disturb vision very much.

Rochat asked if the diminishing action of the negative lenses might make the images more illuminated and better observable. Wibaut computed this expected change in illumination and concluded that this stronger illumination does not produce improved vision, as is given by the negative lens.

Van der Hoeve suggested the improved sharpness of the image thru negative lenses, due to the simultaneous narrowing of the pupil.

Marx quoted Bjerrum, who ascribed this improvement of the image to the fact that the same quantity of light is concentrated on a smaller retinal surface.

Prevention of Loss of Vitreous.

J. VAN DER HOEVE states that sometimes quite an amount of vitreous can be lost without damage. But on the other hand small disturbance can produce permanent damage, so that the ophthalmologists agree that it is good to disturb it the least possible and to prevent its loss.

In operations, where there is danger of this complication he proceeds thus: he puts 4 threads with fine needles thru the sclera without perforating this near the cornea at 90 degrees distance from each other. At the place where the bulbar incision is going to be made he puts a corneo-scleral thread without perforation. Two assistants take each two threads, of the 4. The bulb is opened in the limbus, between the two parts of the corneo-scleral thread, the

incision, if necessary is enlarged with scissors.

If, for instance, a luxated lens must be delivered, a hook or loop is introduced. If during this action the vitreous threatens to escape the assistants pull with equal force the threads outward and forward; which brings the bulbar wall outward and the pressure becomes negative. After finishing the operation the corneo-scleral suture is tied and the 4 assitant threads removed. Loss of vitreous can thus be prevented or reduced to a minimum.

This procedure can be helpful in all cases where loss of vitreous may be expected; removal of a luxated lenses from the anterior chamber or vitreous, of subluxated lens from the pupil; cutting away of secondary cataract; removal of the lens in its capsule; cataract removal, in eyes in which we know or can surmise with great confidence that the vitreous is fluid; operations in eyes without a lens, also for freeing an anterior synechia from the cornea. The corneo-scleral suture should not remain longer than 24 hours *in situ*.

DISCUSSION. Tresling corroborated the good results and thinks that the location of the threads does not need to be so exact. By putting the threads more backward toward the ocular muscles he could make a bag-mouth suture in a case of lens luxation, and would not need the corneal suture.

Weve feared greater danger from infection thru aspiration, and objected to the many needed hands.

Van der Hoeve finds that the corneal suture hardly makes the incision more difficult. He fears from the more backward displacement of the threads an undesirable deforming of the bulb. The many hands do not disturb; the danger of aspiration can be prevented by careful removal of the fluid.

Zeeman believes much in the upper and lower threads, because after incision these scleral points will be in need of greater assistance than the temporal and nasal ends of the horizontal meridian; the procedure recommended for synechotomy, without the corneal suture, has given him good re-

sults; he likes the conjunctival flap prepared before the incision.

Van der Hoeve stated that this conjunctival flap is laid over the cornea and disturbs the sight. He also considers the upper and lower threads of the most value, which at the same time help in fixing the bulb.

Wilbaut mentioned that Bader has shown with tonometric measurements that the chances for vitreous loss in young people are greater than in old ones, and recommends the described method for all young cataract patients.

The Struggle of the Visual Fields.

C. OTTO ROELOFS stated, that if the two retinal images are so unequal, that they cannot be united to one single representation, they will be perceived mostly alternately, the so-called struggle of the fields.

In this struggle one of the retinal images can preponderate. The fact, that during the struggle the preponderating image disappears from time to time points to disturbances of the intensity, wherewith the retinal image is perceived. These must be pretty strong, as even images with sharp borders and strong contrasts disappear temporarily, even if the other eye looks at an even black field. These disturbances have for each eye an individual course. The physiologic process, which is at the bottom of it, is not in the retina; as the adaptation progresses regularly without being disturbed by the disappearance and appearance, and the phenomenon begins before the adaptation can have any significance. Indications exist, that the process must be localised high up in the central nervous system. In the beginning of an observation the interest for the observed object is the greatest, then gradually diminishes, while the multiplicity of the interest disturbances in the different parts of the visual field remains about the same. The interest diminishes strongly from the center towards the periphery, the multiplicity of the interest disturbances increases slightly toward the periphery.

Also some difference between right and left eye exists for the speaker.

The interest for the image of the left eye seems a little greater, the interest disturbances somewhat less in number. A difference between the nasal and temporal sides of the visual field was observed, which may be explained by greater interest for the nasal halve. A distinct difference was found between upper and lower visual halves. The number of interest disturbances was about alike, but the interest for the upper half, showed greater. This unsuspected result, which seemed somewhat dependent on the choice of objects, seems to be connected with differences in adaptation and light sense. Differences between right and left halves of the visual field, that is between right and left hemispheres, were not clearly present. Perhaps the multiplicity of the interest disturbances is somewhat larger for the right hemisphere.

The investigation has demonstrated, that for the observation of stimuli and contrasts well above the threshold value, interest disturbances exist. The attention itself is very changeable and dependent on many factors. The multiplicity of the interest disturbances is far more stable; and where differences could be demonstrated, they only were small. It will be interesting to investigate these interest disturbances also for the other senses and to compare them.

Color Sense in the Animal Kingdom and in Man.

H. WEVE read a paper on the subject, not abstracted here.

Distribution of Phlyctenules Along the Limbus.

E. MARX has observed a certain regularity. They appear preponderantly in the horizontal meridian. Marx has put down his cases for 1917 and 1918 around a dial. The temporal halves show more cases than the nasal ones: 89, and 91 for the temporal halves of O. D. and O. S., against 43 and 51 for the nasal sides of O. D. and O. S. In the upper quadrants the least number appear.

Anatomic reasons can not be

found, and we must look for external reasons. The outside atmosphere cannot have an important influence, because in the tropics scrofulous ophthalmia is less frequent, which excludes the influence of illumination and desiccation. Comparison of the months in which the phlyctenules appeared the most showed the same number in February and July 1917 and January and June 1918. Perhaps dust can explain a little, as the temporo-inferior quadrant is the least protected.

ROYAL SOCIETY OF MEDICINE.

Sections of Neurology and Ophthalmology.

March 10 and 11, 1921.

PROFESSOR REYNOLDS and DR. JAMES TAYLOR, Chairmen.

Ocular Palsies.

DR. GORDON HOLMES, who opened the debate, devoted a good deal of attention to the question of the situation and nature of the lesion in various forms of paralysis or paresis of oculomotor nerves, and he had much to say about associated palsies. A matter of much interest was the "unwillingness" or reluctance of some patients with cerebellar disease to turn the eyes towards the side of the lesion in performing conjugate deviation.

Since he had been attached to the staff of Moorfields Eye Hospital he had seen many cases of ocular palsy, and in each of them he was conscious of a difficulty in deciding what the case was likely to be due to. Only by a careful weighing of the signs of associated disease could even a presumptive diagnosis be arrived at. With regard to such palsies occurring in association with Graves' disease, it was interesting and surprising that not very many years ago Hughlings Jackson and others regarded such palsies in this connection as very exceptional. Dr. Holmes, however, now saw a considerable number of cases in which the association existed. One had to regret, however, a paucity of histologic work in this relation.

With regard to so-called rheumatic

or toxic neuritis of oculomotor nerves, he had seen a number of these cases, and there was a frequent involvement of the external rectus, or of the muscles innervated by the third nerve, associated with pain in the forehead on the same side; sometimes there was considerable anesthesia. In some cases he had seen there was a septic focus in the neighborhood. In these cases Déjerine and others had found merely degenerative changes in some parts of the nerve. He did not find it easy to conceive of cold affecting ocular nerves in their intracranial course. He did not feel that these cases were rheumatic, nor purely toxic, because most toxic affections were bilateral, or at least more or less symmetric; whereas most of these palsies were unilateral. In the spinal cord, local collections of cerebro-spinal fluid formed and compressed the roots of the nerves, or the cord itself; and he thought loculated collections of cerebro-spinal fluid might form in the base of the brain and involve one of the oculomotor nerves.

MR. LESLIE PATON spoke of the complexity of the subject. For example, one disease alone—syphilis—was capable of producing an oculomotor paralysis in many different ways. It might affect any part of the oculomotor apparatus: cortical, supranuclear, nuclear, nerve roots, nerve trunks in their intracranial course, in the cavernous sinus, or in the orbit; or it might implicate the muscles themselves. A gumma might develop at any point. A syphilitic meningitis might affect the nerves. Syphilis, setting up disease of vessels, might cause hemorrhages affecting the nuclei or nerve roots. Or a syphilitic arteritis in the internal carotid might press on nerve trunks in the wall of the cavernous sinus, or an endarteritis might affect the vessels supplying the crura, the midbrain, or the pons, and cause areas of softening. Or syphilis might cause general paralysis, or tabes and hence the variety of ocular disturbances found in them. Yet probably not more than 40% of the cases of ophthalmoplegia were due to syphilis.

Oculomotor paralyses might be divided into *three main groups*, of which there were subgroups.

I. Paralyses of central or cerebral origin, comprising

- (a) supranuclear lesions;
- (b) intranuclear lesions;
- (c) nuclear and nerve root lesions;

II. Paralyses of extracerebral origin, i. e., of nerve trunks, again comprising, as subgroups, (a) intracranial, (b) intraorbital.

III. Paralyses of muscular origin.

The arrangement and relations of the oculonuclei was, he said, the subject of much discussion, and no dogmatic opinion was possible at the present stage of knowledge. The important intranuclear set of fibres was, undoubtedly, the posterior longitudinal bundle, for it was by means of this that the various oculomotor nuclei were brought into connection with one another and with the vestibular and auditory functions, and with the general muscular, the sense and the other afferent impulses in the body.

The connections of the posterior longitudinal bundle are, he said, intricate, and had not been yet completely worked out. The most important nucleus of origin of these fibres lay in Dieter's nucleus. The control of the internal musculature of the eye was also a matter of considerable doubt and dispute. The vascular supply of the oculomotor nuclei was derived from the anterior end of the basilar artery. The vascular lesions affecting the pons, crura and this region gave rise to various interesting forms of crossed hemiplegia, the most important being known as "Weber's syndrome," "Benedict's syndrome," "Foville's syndrome," and the "Millard-Gubler syndrome."

Nuclear ophthalmoplegias, or ophthalmoplegias proper, could be subdivided into acute and chronic types. The acute included the toxic form caused by alcohol, Wernicke's acute polioencephalitis superior hemorrhagica being a good example. Good examples of the infective type were found in lethargic encephalitis, influenza, and syphilis. In a very definite proportion

of cases of acute ophthalmoplegia, however, no infective agent can be traced. Of chronic progressive ophthalmoplegia, the most important form was that occurring in tabes and general paralysis of the insane. There were, besides, certain ophthalmoplegias of congenital origin, and others were of a distinctly familial type.

DR. WILFRED HARRIS thought cases of chronic nervous disease in which weakness of one internal rectus was noted on attempts at conjugate deviation, were not rare. He had seen a number. One was in a subject of disseminated sclerosis, who could not look upwards, tho' other eye movements were intact; he had no nystagmus. Such cases were probably due to interruption of the fibres of the posterior longitudinal bundle. He spoke of cases of damage to the 6th nerve following injection of the Gasserian ganglion with alcohol. The patient was a difficult subject, in whom three attempts had to be made, and then suddenly a greater quantity of alcohol than was intended entered the locality. Recovery from the result of this accident always occurred in a few months. He asked whether his colleagues recognized a rheumatic neuritis of oculomotor nerves, branches of the 3rd or the 6th in the orbit. It had not been rare for him to see palsy in the external rectus with some pain in the orbit, and there might be some anaesthesia. He did not think the teeth were at fault in all the cases, nor was a definite septic focus evident.

DR. J. GRAY CLEGG, (Manchester), devoted attention to the occurrence of *ophthalmoplegia in Graves' disease*. Osler and McCrea regarded such occurrence in this disease as a complication, rather than as part of the main disease; but in his "Pathology of the Eye" Parsons said extrinsic ocular paralyses in this association were not uncommon. J. S. Bristowe had recorded a case in which ophthalmoplegia externa followed Graves' disease after an interval of three years, and in that case no disease of the nervous system was found *postmortem*. This and similar cases Hughlings Jackson re-

garded as remarkable. According to G. F. Suker, a new ocular muscle symptom was present in quite a number of cases of Graves' disease, which that observer designated as a deficient complementary fixation in lateral rotation. It was considered by him to be due to the same underlying conditions as those which produced the other ocular muscle symptoms, i. e., dissociation in the functions of the sympathetic and extraocular motor nerves of the eye. But it was rare for practically complete bilateral double ophthalmoplegia to occur in this association. Dr. Gray Clegg recorded in detail one such case in this contribution. Considerable recovery of ocular muscle power took place during the patient's convalescence from the general disease.

DR. S. A. KINNIER WILSON limited his remarks to the question of the possible occurrence of unilateral *cranial polyneuritis*. He related the case of a man who had been in Palestine and Egypt, and in Cairo was very ill with pneumonia and pleurisy, and seemed to have a generalised pneumococcal infection. While his illness was at its height he developed complete paralysis of the 7th, 8th, 9th, 10th, 11th, and 12th cranial nerves, but only on the right side. Ordinary tests for nervous disease, and syphilis tests proved negative. He had a girl under his care who certainly had a rheumatic diathesis, and she had paralysis of the 5th, 6th and 7th nerves on one side only. A case was on record of an Italian engine driver who always stood on the right side of his engine, and had the wind and rain on that side of his face; he developed paralysis of the 3rd, 4th, 5th, 6th, 8th and 12th on the right side only.

MR. N. BISHOP HARMAN commented on the comparative rarity of cases such as were under discussion. He said that in a consecutive series of 5,000 patients he had found only 27 instances of ocular palsy. Males were more often affected than were females (males 17, female 10). Paresis due to injury headed the list of causes, with 7; syphilis caused 5, and general vascular disease or degeneration 5. Two cases due to exposure were arguable; but in one of them there were very definite manifestations of in-

flammation over the affected muscle, and both cases were rapidly cured. His cases did not warrant the view that life was shortened by the occurrence of these paralyses. With regard to treatment, he said he knew of no more satisfactory way of overcoming the diplopia than the wearing of spectacles of which one lens was of ground glass. And of local measures of treatment, blistering, massage, and faradism were effective when the lesion was peripheral.

MR. HINES read a joint paper by himself and MR. MACMULLEN on *chronic progressive ophthalmoplegia externa*. They said that in their text-book on "Neurology of the Eyes," Wilbrand and Saenger grouped as a clinical entity certain cases of external ophthalmoplegia, which they considered to have certain definite characteristics which separated them off from the congenital cases, as well as from those due to definite toxic causes, or to syphilis, or associated with some manifestations of wider spread disease of the nervous system. These cases Wilbrand and Saenger stated to have the following characteristics: 1. Onset gradual, usually in infancy or early life. 2. The ophthalmoplegia is bilateral and very slowly progressive. 3. There are no other signs of disorder of the nervous system, nor any affection of the general health. 4. The disease may come to a standstill, either permanently or for long periods, at any stage in its development, but generally ends in complete, or nearly complete external ophthalmoplegia. Mr. MacMullen and Mr. Hine showed to the Section two patients whose condition tallied with this description, and they had seen a third.

MR. M. S. MAYOU sent a short communication on the two cases of *paresis of the upward and downward movements of the eyes*. A man aged 46, while straining at stool, was seized with severe pain in the head, and giddiness. Afterwards he could scarcely walk owing to the diplopia and inability to look in a downward direction. The pupils were active to light. Convergence and lateral movements were normal. The vision was 6/12 in each eye, there was no optic neuritis, and the knee jerks were present. Wassermann reaction was nega-

tive. After rest, and the administration of iodid of potassium, the patient obtained full movement in the downward direction, but there remained some limitation of the movement of the eyes upward, and the attempt brought on a coarse nystagmus. Recovery was now practically complete. The second case was also a male, and his age was 42. He was suddenly seized with intense vertigo and diplopia, but no headache. The pupils were very sluggish; vision 6/6 in either eye. Outward and inward movements were free, but all power of convergence was abolished. Knee jerks were present, Wassermann test negative. He was put on iodid of potassium, and gradually recovered. The sudden onset suggested hemorrhage as a cause. Mr. Mayou said the position of the lesion had been variously stated to be the optic thalamus, the corpora quadrigemina, the pons, and some thought it was subcortical. None of those conjectures had been verified by *postmortem* examination.

MR. J. H. FISHER, referring to the cases in which the *6th nerve* was accidentally damaged when injecting alcohol into the Gasserian ganglion, said he thought the damage did not occur actually in the floor of the cavernous sinus, but that the alcohol had stripped up the dura mater and involved the 6th nerve behind the sinus.

DR. JAMES TAYLOR expressed regret that *myasthenia gravis* had not loomed fairly large in the debate, as that was one of the common grounds on which the neurologist and the ophthalmologist met. Since he had been associated with Moorfields Eye Hospital he had seen many such cases, and he had been impressed by the great variability in their course, tho in many the progress was definitely downwards. On one day the patient would have almost complete command of ocular movements, and at another time he could scarcely carry out any ocular movements, nor effectively use his arm and hand muscles. He described one remarkable case which was in an advanced condition, in which the patient suddenly developed an intense desire to return to his home—some 80 miles distant—where he went, and was not heard of again un-

til he wrote asking for a certificate that he had been a sufferer from myasthenia, as he had been warned for military service. He was at the time following his occupation of carpenter.

H. DICKINSON.

THE OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES.

February 2, 1921.

DR. F. GUY ANTILL POCKLEY, President

Cyst Under the Lid.

DR. E. A. D'OMBRAIN showed a little girl aged 10 years with a swelling under the upper lid near the inner angle. She also had a purulent conjunctivitis. The condition had been present for a week but otherwise there was nothing abnormal in the child's history.

DISCUSSION. Dr. Halliday believed it was a cyst and should be removed by operation; while Dr. Kelly was of opinion that it was probably an infected cyst.

Entropion of Infants.

DR. J. C. HALLIDAY showed two cases of entropion in children.

On one child 10 months of age he had operated by means of Snellen's sutures, and the condition was much better. The other child was only 5 months old, and he had done nothing beyond advising massage of the lid. The mother reported that another little girl had had a similar condition as a baby but had recovered.

DISCUSSION. Dr. Kelly said that he thought they were cases of spasmodic entropion. Dr. Guy Pockley considered the second case due to epicanthus. Dr. D'Ombrain had seen two or three cases in little children, and a good result was obtained by pushing the lower lid in with the fingers. Another case wore spectacle frames without glasses; the contact of the lower edge of the rims kept the lid in proper position until the eye recovered.

Angioma of Lid.

A third case shown by Dr. Halliday was a congenital angioma of the eye lids with conjunctivitis, in a child

which was seen two weeks after birth. He had tied off some of the growth, and was applying electrolysis. There were obviously still blood vessels in the lids. The meeting expressed a wish that Dr. Halliday should further report on this case.

Traumatic Cyst of Iris.

DR. GUY ANTILL POCKLEY showed a case of a boy about 7 or 8 years of age. Two and a half years ago the boy was playing with some wire, when it broke, and the end springing back, hit him in the eye, causing a perforating wound in the cornea and the iris. A traumatic cataract had resulted, for which he had done a needling.

He did not see the child again until today when he noticed that on the margin of the laceration of the iris there was a small elevated patch of brown pigment, about a couple of millimeters in diameter, which appeared to be in the structure of the iris, and in his opinion split it into two layers. It had new vessels running into it, and there was a slight blush on the temporal side of the cornea, indicating an inflammatory condition.

It struck him as highly probable that it was a small implantation cyst in the iris, and thought it might be interesting to show, after seeing the large cyst which Dr. Halliday had shown at the last meeting in a case which gave a somewhat similar history. He proposed to keep it under observation, and if there should be any sign of increase in the mass, he would do a small iridectomy and remove it.

DISCUSSION. Dr. Kelly thought that the discoloration was due to pigment from the posterior surface of the iris; Dr. D'Ombrain also held this view.

Dr. Halliday reported that he had operated on the little girl shown at the last meeting. She had a cyst at the periphery of the iris following a perforating wound. He attempted to remove the cyst but it collapsed and he had to enucleate the eye. If he should have another case he would do a small iridectomy and try to remove the cyst from the cut edge of the iris.

J. J. KELLY, Secretary.

THE PUGET SOUND ACADEMY OF OPHTHALMOLOGY.

Meeting of February, 1921.

Release of Iritic Adhesions by Suction Massage.

DR. H. V. WÜRDEMANN read a paper on this subject published in this Journal p. 446.

DISCUSSION. Dr. Hoffman thought massage of the eye contraindicated if inflammatory symptoms are still present as the condition might be aggravated, with formation of fresh exudate. A recurrence of acute iritis would more

He had seen Dr. Würdemann treat a case of optic atrophy in which marked improvement of fields and vision had been secured. The immediate result of a treatment is intense hyperemia of the retina and nerve head.

Dr. Würdemann in closing said: criticism of this procedure may be made, that it is radical and might cause damage to the eye from intraocular hemorrhage. Such is indeed true, but if used with discernment, none need arise. The principal object of treatment in iritis, aside from relief of pain and removal of its causes, is to prevent

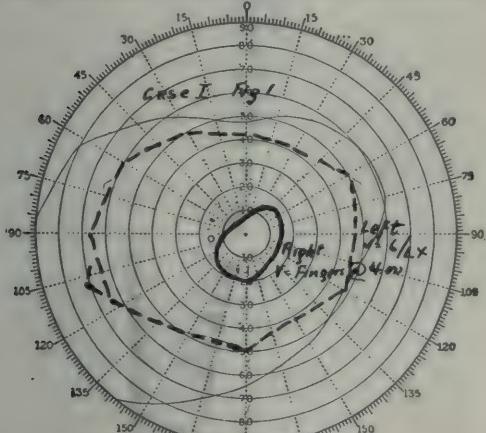


Fig. 1.—Field of vision left eye, chronic glaucoma with acute exacerbation.

than offset the good done by breaking up adhesions.

Dr. Wanamaker thought massage, if not severe, might be beneficial even in an inflamed eye on account of the hyperemia secured, as in hot applications.

Dr. Swift thought there would be considerable danger of hemorrhage in the manipulation especially in elderly people.

Dr. Mattice emphasized the importance of blood pressure measurements and examination of the fundus for arteriosclerosis before massage, also danger of detachment of the retina in myopia. In elderly people with weak zonulae the lens could easily be dislocated. In selected cases where inflammation has sufficiently subsided there would be little risk in suction massage.

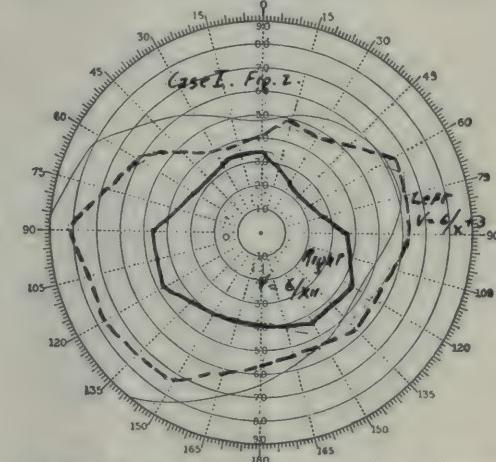


Fig. 2.—Left eye of Case 1 after trephining showing increase of fields.

filling up of the pupil. Atropin is used mainly for dilatation and where it fails in recent cases the synechiae are broken away by the massage. Pathology of synechiae shows that at first the adhesive bands are exudative, later becoming organized into elastic tissue, which cannot be rended by mechanical means except by instrumental cutting of the bands, which, in many cases would also tear the anterior capsule of the lens, causing cataract, and hence such operations are not to be recommended.

Chronic Glaucoma with Acute Exacerbation.

DR. H. V. WÜRDEMANN reported the following: CASE 1. a merchant, age, 63. History: Reduced vision, especially in right eye. Wearing glasses for last 30 years, from opticians; remeasured about three months ago. At

times for the last three years the right eye has become inflamed and sight failed with each attack. Sees rainbows. Reads very much. Very high liver. Eats much meat, pastry, excessive coffee, wines, etc. Short, thick-set man. Superficial circulation plainly seen in face. Blood pressure, 210-125; heart, normal except for accentuated second sound; Wassermann, negative; urine, negative except for hyperacidity.

Eyes: Vision, R. fingers at 4 meters; L. 6/60. With right and left +2.50, vision equals 6/24 and 6/6.

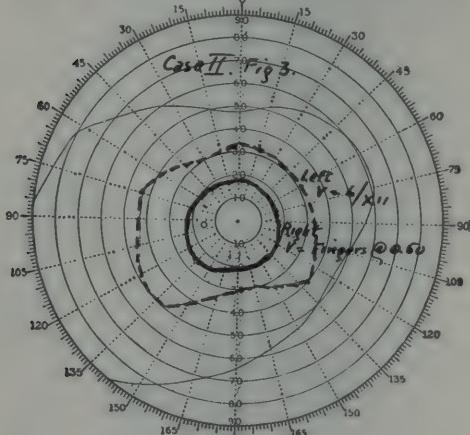


Fig. 3.—Field of vision left eye Case 2.

Visual field, right, constricted to a small circle under 10 degrees, nasal, and under 20 in other directions. Left visual field slightly constricted. Tension R. T.+3. L. T. plus. Glaucoma discs both eyes; angiosclerotic vessels. Quite exhausted at time of examination. No mydriatic was used. Came in the next day with an acute glaucoma in the left or better eye. Sent immediately to Swedish Hospital, where two pounds of blood were removed from arm by venesection. Eserin hot compresses; purgatives.

November 26, 1920, double Elliot trephining with iridectomies under ether, with stitches. Progress very good; stitches removed in office, December 1, 1920. Glasses prescribed December 27, 1920, right and left, +3.00 and add +3.00. Vision, right, 6/60; left, 6/12. Blood pressure, 180-

100. At subsequent examination blood pressure 190-95. Diet materially reduced. Sodium iodid, internally, pilocarpin, locally.

February 8, 1921. With correcting lenses vision, right, 6/12; left 6/10-3. Visual field, right, increased to practically 40 degrees; left normal. No haloes except when looking sideways at light, but occasionally sees colors. Tension, right and left, minus one. Large bleb over trephining hole, right. Left can be produced by rubbing conjunctiva. General conditions excellent, attending to all business, but is

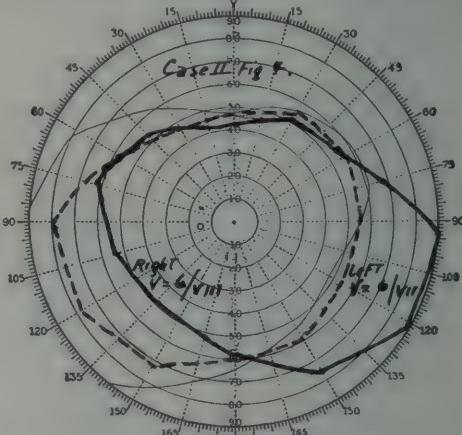


Fig. 4.—Fields of vision both right and left showing recovery Case 2.

keeping on strict diet. Fundus shows glaucoma cups more marked in right eye. Case reported to show unusual restoration of vision in almost blind right eye, and for the beneficial effects of the operation and general treatment.

CASE 2. M. age, 64, dishwasher in restaurant. Right eye sore for one week; cannot see, haloes. 3/29/20. Short, well-fed man; blood pressure, 160-85. Vision, right, counts fingers at 50 c. m.; left, 6/12. Greatly contracted visual fields, the right a circle down to 20° and the left between 40° and 30°. Cupping of optic discs. Tension both eyes. Right congested anterior chambers shallow. Prescribed pilocarpin and Rochelle salts and diet. April 6, 1920, double Elliot operation with iridectomy, rather difficult, done under local anesthetic, hyoscin grain 1/100 and morphin grain 1/4. Patient very nerv-

ous and small amount of chloroform given by anesthetist. Uneventful recovery; stitches removed in office on the sixteenth. Glasses prescribed June 10, 1920. With right and left +.50, add +3.00, vision equal to 6/8 minus 2, right; 6/7½, left. Patient seen a number of times afterwards and vision remained good. Visual fields increased. Case also reported to show exceptional recovery. 2-14-21. V. F. full size both eyes. V. R. 6/viii, L 6/75.

Glaucoma Following Traumatic Iritis Detachment of Retina.

Mr. W. C. Age, 41; birthplace, Germany. History: Blind in left eye for two years, following an injury of the head in a train wreck 2½ years ago. Eye tender to touch; inflamed from time to time with shooting pains. Examined 8/9/20. Vision, right, 6/6; left, blind. Heavy-set woman in apparently good health; blood pressure, 140-85. Many capped teeth, several abscessed, which were later removed. Iritis left eye with total detachment of retina; tension minus. Enlarged tonsils, not inflamed. Treated with sodium salicylat, internally; diet; atropin; dionin and high frequency heat electrodes, at times of office examinations. September 10, 1920, eye quiet. September 30, 1920, tonsillectomy under general anesthesia at hospital. November 2, 1920, came back with coryza; left pupil dilated ad maximum; tension plus three. Typical acute glaucoma. December 2, 1920, transillumination negative, and this has been used a number of times; tension plus three. Eye inflamed; great pain. Continued local treatment with aspirin, sodium phosphat, until January 4, 1921. Patient sent to Swedish Hospital, Elliot trephining with slight loss of vitreous, with root of iris removed; local anesthetic, grain 1/100 hyoscine, grain 1/4 morphin. Wassermann, negative; urine, negative. Operation has completely relieved the symptoms, but there is yet tension in the eye. The pupil is widely dilated; the prolapsed retina is readily seen by direct examination and oblique illumination, as well as with the ophthalmoscope.

The transillumination absolutely negative. Case kept under examination and advisement on account of possibility of intraocular tumor. History reported to show relief from symptoms by operation, as well as the very unusual establishment of glaucoma in an eye that has had detachment of the retina.

Cataract Operation, Followed by Iridocyclitis, Hyalitis, Blindness.

Mrs. G. J. S., Bend, Oregon. Examination, July 30, 1910. Perinuclear brown cataract both eyes. Vision, right, counts fingers at 4 m.; left, fingers at 3 m. Seen a number of times until September 17, 1918, when I did a normal expression of lens in capsule, at Swedish hospital. Lens was a tumbler. Patient a thin, wiry woman with nervous temperament. General physical examination normal, except for acid urine. Normal healing. Vision equal to 6/20 with +9.00 combined with +7.00, 165°, add +3.00. Vision equal to ordinary print. September 7, 1920, at Swedish hospital, expression in capsule, capsule ruptured. First dressing showed debris in anterior chamber, no reaction, but there was a veil in the pupillary area when she returned home about six weeks later, with advice to return in 30 days or so for dissection of capsule. Came back November 29, 1920, with eye inflamed, left pupil filled with yellowish membrane and iridocyclitis. At this time X-ray of teeth showed two lower left molars and lower right first molar abscessed. Teeth extracted. Vision, left eye, December 17, 1920, equal to shadows, tension minus, eye quiet. Had been given salicylates in moderate doses. About the first of January, she went to Spokane, with a card to Dr. Veasey, in case anything happened. Returned from Spokane on January 27th, with letter from Dr. Veasey, stating that the right eye had become hazy a few days before. No view of the fundus could be obtained and case has progressed until there is practically blindness in the right eye. Tension is greatly lowered. Gave sodium salicylat, atropin and dionin. It is probable that the infection of the left eye

was endogenous from the apical abscesses of the teeth and it is probable that the removal of these teeth opened up the blood vessels, permitting the infection to get into the general circulation and then into the right eye. It is comparatively often noted that in cases of rheumatism, where teeth are removed, an acute attack of rheumatism supervenes after the operation, despite the fact that the removal of the teeth, in some cases, removes the infection from the system and produces an immediate cure and a similar event is believed to have taken place in this case.

Tumor of Optic Nerve.

DR. G. W. SWIFT reported the case of Miss N. W., age 16, who noticed shortly before Christmas, 1920, that she could not see with the right eye. Gradually it became slightly prominent. She has consulted several oculists in regard to her condition. There is nothing in her past history of importance except influenza one year ago. A well nourished young girl, fully developed physically. Left eye vision is 20/15. Pupillary reactions, media clear, optic nerve and retinal vessels normal. Right eye vision nil.

The eyeball shows a marked degree of exophthalmos, no paralysis of the ocular muscles elicited, the cornea is clear, the anterior chamber is of normal depth, pupil 4 mm., does not react to light, the media are clear. The optic nerve shows a marked edema with the vessels greatly congested, veins about the size of the arteries and seem to be elevated to 4 diopters, no areas of degeneration in the retina. Auscultation over the temporal region negative, pressure on the eyeball changes the caliber of the vessel slightly, but pressure on the carotid has no effect.

The diagnosis in this case is made by exclusion. A stereo X-ray, and also X-rays of the sinuses, reveal no bony changes or evidence of pus. Her Wassermann is negative, blood count is normal, temperature is normal.

From these findings one would exclude a cavernous sinus thrombus; a sphenoidal sinitis; ethmoidal sinitis, maxillary sinitis. There remains the possibility of a neuroma of the optic nerve, which is the diagnosis in this case.

I have suggested to the parents the possibility of removal of the neuroma, either by a tenotomy and attempting to remove the nerve clot or by a Kroenlein operation. I present this case for suggestions as to diagnosis and treatment.

DISCUSSION. Dr. Würdemann agrees with Dr. Swift's diagnosis and method of procedure.

Dr. Mattice said he had seen a small neuroma of the optic nerve removed by tenotomy and partial dislocation of the eye ball without a Kroenlein.

Dr. Bell said he had seen this case September 25, 1920. Pupillary reaction normal. Anterior chamber normal in depth. Tension of both eyes normal. Vision R. fingers at 2 feet. L. 20/20. R. disc margins normal. Vessels extend 4 D. into vitreous before passing to retina, whitest streaks about superior vessels. No elevation of disc. Arteries and veins both enlarged, slight exophthalmos. No up or down, right or left displacement. History: Reduced vision 4 weeks ago with headache at back of nose—accompanying transilluminate showed shadow over O.D.

Sclerosing Keratitis.

DR. W. G. CAMERON reported the case of Miss F. B., a telegraph operator, age 25, who in appearance was in the best of health. On November 19, 1920 she came to see me giving the following history: About two weeks ago she noticed a slight blurring of vision with her right eye. This gradually increased and the eye became painful in bright light.

Examination showed vision right eye 6/60; left eye 6/6. In the lower outer quadrant of right cornea is a small area of diffuse infiltration. The bulbar conjunctiva in this region is injected. The iris has a tag attached to lens which stretches out when eye is

dilated. Slight cloudiness of vitreous. Fundus normal in appearance.

She has enjoyed good health all her life and has had no disease except those of childhood. Has had no previous eye trouble. Her family are free from any of the diseases regarded as hereditary and give no history of eye disease. She was sent to a hospital and placed under the care of a general physician, where she still remains.

Her physical examination is negative, lens, heart, and digestive apparatus being normal. Urinalysis negative. Three Wassermann negative. Tuber-culin test negative. Transillumination of sinuses negative. Tonsils showed very slight evidence of disease but were enucleated January 11. Had two X-ray pictures of teeth which were reported normal. Another X-ray of teeth is to be taken today and she has consented to have three suspicious teeth extracted.

Since I first saw her three months ago her eye has steadily grown worse. The infiltration has spread from a small area until it occupies the entire lower outer quadrant. At first the infiltration was some what diffuse but it has gradually become more dense until now it has become quite opaque and has the characteristic porcelain appearance of sclerosis. She has been quite free from pain except photophobia, at times the eye clears up for a few days and she is quite comfortable, only to be followed by an exacerbation of the symptoms.

She can still see 6/60 thru the clear part of her cornea tho not so clearly as when I first saw her.

Dr. Würdemann agreed with the diagnosis of sclerosing keratitis, stating that it is characterized by the porcelain appearance of the opacity. He called attention to the pathology in that it was similar to keloid of the skin, being composed of dense fibroid tissue.

Dr. Swift had seen good results from treatment with high frequency electric current.

Dr. Mattice suggested use of radium, as the pathology of sclerosing keratitis is very similar to skin keloid which yields to radium.

Iridectomy for Glaucoma.

DR. A. F. MATTICE showed a man 72 years old on whose right eye a glaucoma iridectomy had been done 6 months previously. Vision at time of operation 20/50, tension, (McLean tonometer), 70. Vision now 20/50 plus 2, tension normal. On account of lens opacities present at time of operation an iridectomy was done in preference to a trephining or other operation involving the upper scleral segment in order to leave the field clear for a future extraction. In this case and several similar ones tension had been permanently relieved by iridectomy alone and Dr. Mattice believes iridectomy should always be first tried when extraction is also to be considered. If a second glaucoma operation should prove necessary it could be done at another point on the limbus.

DISCUSSION. Dr. Swift did not agree with Dr. Mattice. He considers glaucoma iridectomy a dangerous operation on account of possible hemorrhage and injury to the lens and prefers to do a trephining at the upper limbus, as he is able to place his cataract incision above or below the trephine opening without complications.

Dr. Bell said that a trephining at any other point than the upper limbus would be more dangerous on account of increased liability to infection.

Dr. Würdemann referred to Casey A. Wood's remark that "not every case of glaucoma requiring operation is best and most certainly relieved or cured by some particular method." Many cases of hypertension were best relieved by constant use of miotics. Of operations, the Elliot trephining, when done upward with a thick flap, is the safest. The Lagrange operation is the most difficult causing the greatest operative trauma but is preferred by some operators as a routine. Iridectomy has been used since the days of von Graefe with occasional cures, perhaps most of them cases with incarceration of iris in the wound, thereby establishing a filtrating cicatrix, which is the object of most operative procedures. Warning was given of the danger of hemorrhagic glaucoma and

detachment of the choroid and retina, from sudden release of intraocular tension, such as occurs in iridectomy.

ALBERT F. MATTICE,
Secretary.

SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.

January 18, 1921.

DR. G. ORAM RING, Chairman.

Disk-Like Congenital Cataract.

DR. WM. ZENTMAYER presented a boy, aged twelve years. The vision had been poor since birth. There was no history of trauma or tetany. Patient's grandfather, father, an aunt, an uncle and two paternal cousins had congenital cataracts.

The examination showed cornea clear and A. C. normal. In the R. E. there was an irregular disk-shaped, chalky-white area in the lens surrounded by a grayish zone. Beyond this the margin of the lens was plainly visible as a highly refractile line appearing like a fine silver wire. The zonule could be plainly seen. No details of the fundus could be made out. The L. E. was as R. E. except that the disk-shaped opacity was smaller. According to Collins and Mayou in disk-like cataract microscopically, the lens is flattened anteroposteriorly so that there are two lateral masses connected by a band. In the central flattened portions of the lens a laminated mass of tissue is situated similarly to that met with in anterior polar cataract; it extends from capsule to capsule. In the rounded portion there is lens substance showing a varied amount of disturbance of distribution in the vicinity of the central portion becoming more regular and normal toward the periphery. Failure of development of the nucleus is probably the cause of the cataract. The cells of the posterior layer of the lens vesicle fail to lengthen out into lens fibers. The activity of the cells lining the anterior and lateral portions of the lens capsule is unaffected. The laminated mass in the center is probably produced in the

same way as an anterior polar cataract, i. e., by proliferation of the anterior cells, as the outcome of low intracapsular tension in their vicinity. In these lenses where the nucleus fails to develop there would be abnormal low intracapsular pressure in the neighborhood of the anterior pole of the lens, hence the formation of an anterior polar cataract. The activity of the cells lining the sides not being interfered with, lateral lens fibers develop. Having no nucleus around which to group themselves they form accumulations of fibers at the sides of the antero-posterior mass, with irregularities and vacuolations of varying distributions.

Tendon Transplantation for Paralysis of External Rectus.

DR. LUTHER C. PETER presented a case of paresis of the external rectus in which he practised tendon transplantation by the O'Connor method. The patient was a woman, aged fifty-two years, who developed a convergent squint in late childhood. The left eye was turned in 30 degrees and could not be rotated temporalward more than to the center. Vision was much reduced by an old choroiditis. By the O'Connor method a conjunctival incision was made about 1 cm. from the cornea, extending from the insertion of the superior to that of the inferior rectus. The superior and inferior tendons were split backwards for about 9 mm., the outer halves severed from their attachments to the sclera and a double arm No. 1 silk suture was introduced in each from within out. The external rectus was split into three strands. The superior and inferior strands were cut vertically about 10 mm., from the attachment and were turned forward and united respectively with the superior and inferior transplants already prepared. The internus was completely tenotomized and the external rectus was advanced by a Lancaster whip-stitch, the middle third of the tendon being included in the tuck.

Recovery was uneventful and the patient now has external rotation of 50 degrees and internal rotation of 40 degrees. Upward and downward move-

ments are full. Inability to converge, altho there is good internal rotation, is probably due to the fact that the vertical recti are now stronger in abduction than in adduction and a perfect innervational balance for convergence is not yet established.

With a view to the improving of the technic the author suggests that the external rectus should be advanced and attached to the stump of the tendon. The overlapping tendon should then be split in half, turned up and down toward the recti transplants and attached. In this change the nutrition of the tendon will probably be better preserved and tendon will be attached to tendon with less chance of the stitches cutting thru. The external rectus tendon is very short, about 4 mm. in length, and the sections by the O'Connor method must include too much of the muscle, with more or less danger of the stitches cutting thru the delicate muscle strands, which are turned forward. Complete or partial tenotomy of the internal rectus must necessarily depend upon the degree of the temporalward rotation.

Injury to the Eyeball.

DR. WALTER L. PYLE presented five cases of ocular injury.

The first patient suffered a penetrating wound of the cornea by a piece of broken glass. The removal was followed by the complete collapse of the anterior chamber. Under the usual first aid treatment there was a complete recovery of the vision and within a few months every evidence of the previous corneal wound had disappeared.

While hunting, a well preserved man, aged forty-five years, received full in the face the charge of a shotgun. Numerous small shot were imbedded in the face and eyelids. There resulted a slight entropion of the lower right eyelid. A large vitreous hemorrhage cleared in a few weeks and there was complete recovery of the vision. At present the most troublesome sequel is the necessity of occasional epilation of aberrant cilia from the area of the entropion.

A nervous boy, aged fourteen years, was shot in the eye with an air-rifle, at about two hundred feet distance. A noticeable feature in this case was the profound shock that followed the injury. When first seen the patient showed a penetrating wound of the left upper eyelid, several contusions of the eyeball and dense hyphema with blood streaked vitreous. One year later all the objective symptoms had disappeared and corrected visual acuity had increased to 6/12.

A sturdy boy, aged fourteen years, was shot in the eye with B.B. shot from an air-rifle at short range. There was a marked contusion of the eyeball and eyelid and severe subconjunctival hemorrhages. Among the sequelæ of the injury was a traumatic cataract, which under local treatment, including the application of powdered dionin, cleared in two small apertures thru which the application of a strong convex lens + S. 10.00 D. afforded vision of 6/12.

While grinding a tool, a machinist, aged twenty-eight years, was struck in the right eye with a fragment from an emery wheel. The injury was followed by a traumatic cataract, gradually reducing the vision to light perception only.

Under full mydriasis a small V-shaped foreign body could be seen, apparently attached to or near to the lower central margin of the iris. The interesting feature of this case was the negative X-ray report. It stated that there was no foreign body in the eye, but inasmuch as it could be seen both by direct and oblique illumination another study was requested. A second report stated that the foreign body was so small that in doing the Sweet localization they were not able to see the shadow in the lateral angle plate to determine the position of the foreign body to the right or left of the median line, but were able to determine definitely that it was in the anterior chamber beneath the cornea.

Dr. Shumway said in connection with Dr. Pyle's second case that he had recently seen a patient who had been struck in the face and chest by a

load of bird-shot. One shot had penetrated the lower lid and lodged beneath the conjunctiva of the eyeball, causing contusion of the globe and a localized vitreous hemorrhage, but the eye showed no perforating foreign body.

Dr. William M. Sweet said the failure of the X-rays to locate a piece of emery in the anterior chamber was not to the discredit of the apparatus or the operator, even tho the particle could be plainly seen by study of the eye. Emery like other similar mineral substances, offers only a moderate resistance to the passage of the rays and therefore there is not seen on the plate the same dense shadow that is made by steel. Even small metallic foreign bodies in the anterior portion of the globe are often difficult to locate, owing to the shadow of the body being lost in the shadow of the dense bone of the external orbital margin.

Concretions in the Lacrimal Canaliculus.

DR. EDWARD A. SHUMWAY reported two cases of concretions in the lacrimal canaliculus, both in women, one in the lower and one in the upper lid. Epiphora with purulent discharge had existed in each case for a number of months, causing catarrh of the conjunctiva, which disappeared at once on removal of the concretion and curetting of the canaliculus. In one patient the infection had burrowed beneath the conjunctiva, producing a cavity which had a posterior fistulous opening 5 mm. back of the punctum on the conjunctival surface of the lower lid. In this case cultures showed the presence of a long thread like organism, so that it was supposed that a streptothrix was present. Further examination showed the organism to be a bacillus in chains, with spore formation, which was contaminated by two other bacilli. Animal inoculation on the conjunctiva was not successful. Dr. Shumway discussed the pathology of lacrimal concretions and said that the concensus of opinion showed that usually the organism found was a streptothrix and that in a number of cases actinomycetes was found, which was classed by most

observers as a streptothrix; in one case a leptothrix had apparently been proved. Dr. Shumway called attention to the appearance of one of the illustrations accompanying the report of a case of Dalens, which showed long threads made up of bacilli in chains exactly like the organism found in the present case. This would apparently exclude it from the streptothrix class.

Ring Opacity of the Vitreous.

DR. L. WALLER DEICHLER, reported the following case: Mrs. M. H. presented herself for examination January 5, 1921, because of poor sight in the right eye. She had had the usual diseases of childhood: "spinal rheumatism" six years ago, ill eighteen months; exacerbations at irregular periods since, but none as severe as primary attack; fell from a bench at eighteen years and injured the left side, but no head injury or eye symptoms noted. About five years ago accidentally discovered she could not see well with the right eye. The condition has persisted ever since, without change, but she has never had any treatment.

Vision: O. D. — 15/200; O. S. — 15/10. External appearance negative, cornea clear; anterior chamber normal in both eyes. Pupils are equal and respond promptly to light and accommodation. O. D.: Vitreous haze permitting but limited view of fundus. Tension normal. O. S.: Media clear; disc well defined and oval at 90 degrees; fundus normal; tension normal.

Both pupils were evenly and fully dilated with homatropin. O. D.: Faint haze of vitreous, permitting, however, a good view of the fundus. Large ring-shaped opacity, oval and slightly flattened above, situated in about two-thirds the depth of the vitreous chamber, in front of and somewhat to the nasal side of the disc, about the size and shape of a cross-section of the lens, everywhere free except for a fine convoluted strand connecting its temporal edge and acting as a guy-rope, so that while this opacity floats around it is kept in the same relative position. View thru this ring is unobstructed, as is view around it. Disc is well de-

fined, oval at 105 degrees. Fundus is everywhere negative except for a small, irregularly oval area just below and to the temporal side of the macula lutea. This has well defined margins and consists of choroidal and retinal change with atrophic change and pigment collection. O. S.: Negative. Field for O. D. gives an absolute scotoma corresponding with the area of fundus change.

Dr. Zentmayer said that he had the records of four cases of annular opacities in the vitreous. They were all similar to the one presented by Dr. Deichler and occurred in the course of a uveitis. They were situated in the anterior part of the vitreous and had a diameter of about that of the orbicularis ciliaris. A possible explanation is that they represent a cast of the ciliary processes.

Dr. Burton Chance stated that he does not believe such ring-shaped opacities as are present in Dr. Deichler's case are unique, altho they are not common. He recalls two cases in his private practice, each of which was accompanied by more or less general uveitis. In the one there was a definite history of traumatism and cataract developed a number of years after, and the other was that of a woman who had a low-grade chronic inflammation.

Pseudo Foreign Body of Globe.

DR. H. G. GOLDBERG reported a case of exudative choroiditis resembling an intraocular foreign body, and presented the patient.

The man had been struck in the eye by a fragment of steel, which had been removed, leaving after it a small wound which suggested the possibility of the entrance of another F. B. He had been seen by several others all of whom concurred in the belief that the pigmented area in the fundus was a foreign substance. The patient was operated upon, unsuccessfully of course, and it was not until after this result that a correct diagnosis was made. Following the operation he recovered normal vision.

J. MILTON GRISCOM, M.D.
Clerk.

BUFFALO OPHTHALMIC CLUB

February, 1921.

Epidermal Graft of Lid.

DR. L. M. FRANCIS presented two cases of epidermal graft of the lid.

Hyaloid Remains.

DR. F. PARK LEWIS presented a boy with the question whether the pigment band extending from the disc and attaching immediately back of the capsule of the crystalline lens was a vestigial hyaloid or whether it was a definite tubular opening extending thru the vitreous.

DISCUSSION. DR. E. E. BLAAUW. I do not think it is pigment. But it is no rarity to see a dark persistent hyaloid artery, and it is not rare to find in the fundus a great many small-chorio-retinal changes. DR. DEBECK in 1890 wrote about congenital anomalies in the vitreous. I remember well seeing two or three pictures of the opening at the lens, and one of a very oblong opening in the macular region.

Hole at the Macula.

DR. COWPER showed a typical case of hole in the macula following injury, with detachment of the retina.

Ring Abscess.

DR. A. C. SNELL reported a case of this disease, (see this Journal, p. 419).

DISCUSSION. DR. L. M. FRANCIS: It might be interesting to recall the observations made by Gauden Wells. He said that keratomalacia is very common among these children, and many of them get well upon the use of cod liver oil. The condition was described by Sidney Stephenson as keratomalacia.

DR. A. E. BENNETT. A few years ago I was called upon to treat a case of ring ulcer that corresponded very much to the description given. At the time I first saw it, it encircled about two-thirds of the cornea. The patient was a paralytic. With the use of carbolic acid, one end would get well and the other end would continue to extend; but by repeated cauterizing I obtained healing.

Swelling of Optic Disc.

DR. A. E. BENNETT reported a case occurring in an alcoholic. He rapidly grew delirious and it was suspected that he had taken wood alcohol. Ophthalmoscopic examination showed both discs swollen four or five D. His reflexes were exaggerated. The pupils reacted to light. A spinal puncture was done, and two ounces of fluid were drawn under extreme pressure; that night he slept; and under tappings repeated each day the discs rapidly came down to normal and his vision improved.

Injury by Explosion.

DR. F. PARK LEWIS reported a case of explosion in a bonfire. The patient was seen some eight or ten hours after the explosion. An X-ray was taken which was reported as negative. The cornea in the left eye was torn, there was a hole thru the iris on the nasal side, also a hole thru the lens, all indicating a foreign body in the left eye. The right eye was swollen shut but apparently without involvement of the cornea. Another X-ray was ordered. The interesting feature was the difficulty in fixing the eyes in taking an X-ray when both eyes are involved. It led to the conclusion that in cases where X-rays are taken, we should be very charitable in our judgment. The X-ray gave evidence of two exceedingly small bodies back of the lens. This was further complicated by the fact that the face was strewn with little bodies. At the end of a week one eye was enucleated and with the greatest difficulty the two bodies were found. After opening the eye, nothing was found, but after washing in water, these two small particles were found.

Dr. Bennett enucleated an eye for a foreign body, at least he was so sure that he took it down to his X-ray man who located it in the ciliary body. The late Dr. Hubbell thought he had the wrong eye because the other eye became inflamed. The foreign body was a piece of copper.

Problems in Prescribing Prisms.

DR. R. H. SATTERLEE said that to his mind there is such a thing as quality and quantity of fusion. It has

always been taken for granted; the greater the heterophoria, the stronger the stimulus necessary to produce fusion and thus bring about binocular single vision. Hence a low muscular error was not supposed to require much stimulation to bring about fusion, and could be safely ignored. This, in his experience, has not always resulted in complete comfort to the patient in an otherwise careful correction of the refraction. In a case of low muscular error, due to causes unknown, the stimuli sent to the muscles are not proportionally distributed and a heterophoria temporary or permanent, uses all available nerve force to establish and maintain single vision. He refers to a lax condition we occasionally find of all the eye muscles, with a slight weakness of one group or single muscle. In a case of this sort, the quality not the quantity of stimulation to govern the fusional faculty requires as much relief as those showing much greater muscular error. This leads to the question of the possibility of testing the power of fusion. To a limited extent the duction tests do this, but these do not tell whether there is a strain in the fusion faculty or not. The prisms used in the duction tests, cause the retinal images to separate and fusion unites them, so the tests measure the utmost distance between retinal images that fusion can overcome. This is a measure of the quantity of fusion, but does not give us any idea of the quality.

The rotation will vary, the seeming amount of heterophoria will vary (sometimes from a systemic disturbance), lack of attention to what we are to bring out, and sometimes to a weariness from too prolonged a test.

One reason for our uncertainty is because we are prone to consider the eye muscle as an entity instead of part of the human economy. An abnormal stimulation sent to one muscle will mask a condition that defies detection; and to uncover this, is often very difficult.

Marlow for years has advised making the patient wear a patch over one eye for weeks, to relax the muscle and bring out the true status. That may

go in Syracuse, but he has not yet developed the personality to get many to enthuse when the subject was even talked of their carrying this out at home.

In the determination of the accommodation-convergence relation we are all at sea for we have to depend on the intelligence of the patient.

To sum it up, the whole thing is in a crude and elementary state. Dissociation to start with is unnatural and develops or masks conditions that do not ordinarily exist. The tests seem to vary in the findings to such an extent, one is often perplexed to determine what is really the true state and having found it to your satisfaction what to do? In a case of weakened interni, some get relief from bases in, some from bases out, some will not tolerate any prismatic correction.

According to Savage, with a horizontal prism placed before one eye, only one nerve is excited and only one eye muscle is brought into a state of contraction; but if the prism is turned to a vertical position two nerve centers are excited—one to depress or elevate the eye—and the other to prevent torsion.

Two men here in Buffalo are doing good careful work, and apparently getting good result: one ignores the slight muscular deviations in his prescriptions, the other strives to correct any deviation from normal no matter how slight by prisms. Both satisfy a large clientele.

Many cases of ill health will develop a temporary weakened convergence which becomes normal on recovery. For many years I took care of a physician's wife who periodically over-worked and when run down she always required a $\frac{1}{2}$ degree prism base down which relieved her at once but as soon as she became rested the prism was intolerable.

Bannister, in his paper says, about 40% of healthy individuals who never had a symptom of eye trouble, have some degree of heterophoria. We occasionally find a case that indicates in every way a correction for a deviation yet will not tolerate any prismatic addition whatever. We seem to have

drifted along the lines of least resistance. Putting at rest a weakened eye muscle gives comfort so we prescribe a prism for that purpose. This seemingly gives relief for a time then becomes intolerable probably because nature revolts against putting a weak muscle at rest.

Taking a 4 degree base up over the right and a 4 degree base down over the left and using the familiar arrow test we find in what we consider a normal balance that it requires a 5 degree prism base in to merge the arrows. If normally we as a race are divergent—as the tests seem to prove—we are all handicapped from the start if we do any prolonged near work. In writing prescriptions this condition is usually provided for by incorporating a prism base in for near work or shortening up the focus by adding plus lenses. If the latter proves the more comfortable then our other tests are wrong and we have drawn the wrong conclusions as to the amount of refractive error. Decentering is rarely specified on prescriptions in this city, which I think is a mistake. A plus 2 sphere only 4 millimeters out of line, means a 1 degree prism. No matter how carefully refracted your patient is he is not comfortable if your centers are wrong, yet many leave it entirely to the optician.

Squint cases are usually refracted and the centering left to Providence. Sometimes a segment is added to relax the ciliary muscle in reading but that is all. With the wide frames in vogue, the centers are invariably 4 to 8 millimeters too wide creating a prism base out over each eye. The sphere tends to relax the eye muscles to normal but this is more than offset by the haphazard centering, making a prism base out which turns the eyes in. No wonder we often fail to get satisfactory results.

DISCUSSION. Dr. L. M. Francis said: Dr. Satterlee is quite right on the question of decentering lenses. I always try to check the centers of the lenses when the glasses are submitted for approval. I am inclined to prescribe prisms for vertical imbalance. As I have said before I think a right hyperphoria is productive of more symptoms

than a left hyperphoria. There are a great many cases of lowered convergence ability and of lowered lateral muscular imbalance, that upon careful study will show either a latent or obvious amount of hyperphoria, the correction of which will cause a disappearance of the difficulties from which the patient is suffering.

Dr. Hubbard: I believe it is a case of personal equation. I prescribe quite frequently prisms for hyperphoria but I make a rule never to prescribe a prism upon one examination. If after three or four examinations I find the condition to be about the same I feel justified in prescribing a prism.

Dr. Blaauw: In those conditions, where the pupil is two or three mm. lower or higher than the other, do you not think it is advisable to take that into consideration? I think there is a great deal in subnormal accommodation that is caused in many instances by the lens and here again the slit lamp comes in, and with its aid chorioretinal changes may be found.

Dr. Clemesha: I think the muscles should be tested for near as well as far. I showed a little instrument devised by Maddox. It is interesting to test the muscles a foot away and then twenty feet away and before prescribing a prism all those tests should be made.

Dr. Bennett: I rarely prescribe a prism with the base in or out. In cases of exophoria and exotropia, and in cases of esophoria I have never seen exercise accomplish the slightest thing. I think occasionally esophoria is best met by operation. As Dr. Clemesha has observed in the great majority of cases of heterophoria, there is also a hyperphoria, and the correction of the latter will give results. I think I was the first one to make the observation that a right hyperphoria is more productive of symptoms than a left hyperphoria. The black shell Oxford are usually worn by young girls who have small faces and narrow pupillary distances and those glasses are always five or six degrees out of centration.

Dr. Phillips: I always take the retinal field on a big chart to find out

whether there are any blind spots around the macula. I know one case of exophoria which was operated upon and about three months afterwards I tested that field and found that there was a little blind spot near the macula.

Dr. Edison: I cannot add anything new on the question of prisms. The great essential is certainly testing the eyes accurately. It is surprising how many changes take place in the ordinary phorometer tests unless the adjustments are right. It is also difficult for some patients to understand the tests. In the exophorias a great deal is accomplished with muscle training. Great relief is obtained in prescribing prisms for near work, particularly in bookkeepers with exophoria.

Dr. F. Park Lewis: It is amazing also how much heterophoria one can carry without being conscious of it. I have some hyperphoria, myopia and astigmatism and yet I have no discomfort.

Dr. Finnerty: I always refer a patient with muscular trouble especially if she is a woman to a physician. I admit I have ordered lateral prisms as taught me by Dr. Lewis some years ago, but we use them opposite to the condition for which they were indicated. They invariably correct that small error by increasing the strength of the muscle.

Dr. Cowper: As Dr. Clemesha said it is important to test the near balance. There will be a high exophoria at the near where there will be none at the distance. A prism for hyperphoria is usually accepted with the base up instead of the base down.

Dr. Satterlee: I use a very small light with a pair of two degree prisms bases together in a small disc. All of these disassociation tests tend to lead to a wrong finding. As to what Dr. Blaauw said, when I find one eye higher than the other, I think it is perfectly proper to get the center of the lenses to correspond to the centers of the pupils; sometimes I find there is a compensation of the superior or inferior rectus which contributes to keep the eyes on the level.

H. W. COWPER, Secretary.

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HYSERIC BLINDNESS.

That functional disability should completely imitate the disability of organic disease is sometimes hard to conceive. Skepticism as to the reality of the blindness and palsies of hysteria has been a great obstacle to understanding them. They have generally been thought of as closely allied to malingering, and the differential diagnosis is difficult, while it is easy to suppose that they arise from similar causes. But they are separated by the wide gap that lies between consciousness and unconsciousness. The malingerer is conscious that he can see, the hysterick is not.

There is no way of accurately knowing the sensations of another person. We may judge their vividness by the reflexes that accompany them, or the actions to which they give rise; but our only first hand knowledge of them is derived from the account given by the one who experiences them. Such account may give a very inadequate or exaggerated impression of them, it must always be checked up

and judged by the objective evidences of disease present; but still it should generally be counted as a fairly honest attempt of the patient to help the physician to understand his condition and to give him relief.

The diagnosis, or even the suspicion of hysteria, has too often caused the rejection of all the evidence the patient could give regarding his sensations or absence of sensation. It should be noted that those who have had the largest experience and the greatest success in dealing with hysterick disorders attach most importance to the loss of function complained of.

The reality of functional loss of sight ought not to be very hard to understand. We produce it whenever we darken the room or close our eyes; and conscious vision departs from us with other sensations when we go to sleep. The practical exclusion of one eye from the act of vision we cultivate when we use the monocular microscope, or the ophthalmoscope, with both eyes open; and unconsciousness of the greater part of the visual field

generally attends concentrated attention to the object fixed. In these different forms of normal control of sight we bring into existence the counterparts of hysterical blindness. Why should it be difficult to admit the possibility of abnormal inhibition of visual functions?

All that is necessary to accept the reality of hysterical blindness, is to assume the possibility of a functional interruption of nerve communication, between a normal eye and brain centres that furnish the basis of consciousness. Hurst, in his book, noticed elsewhere. (p. 633) refers to the throwing out of dendrites by the nerve cells, or some biochemical change, as the possible, essential condition of nerve conduction; and the failure to throw out dendrites or make such biochemical change as may serve to interrupt the usual connections thru nerve paths. This particular idea Hurst uses merely as an illustration of how such interruptions might be brought about. But we must admit that in some way they can be brought about physiologically, and therefore in all probability as a manifestation of disease. Such interruptions of nerve connections brought about unconsciously and involuntarily, are quite sufficient to account for all cases of hysterical blindness.

The observations reported by Hurst are particularly important, because they include as symptoms of hysterical blindness absence of the "flinch reflex," the tendency to wink when a sudden motion is made to strike the eye; and the great reduction or even the complete suppression of the reflex of the pupil to light. Complete loss of the light reflex has been regarded as evidence of organic disease interrupting the visual tract. It must still be accepted as evidence of a real interruption, even tho its rapid restoration with vision be accepted as proving that the interruption was only functional.

When blindness is a symptom of hysteria, according to Hurst, it "has been produced by suggestion and is curable by psychotherapy." The sug-

gestion may come from different sources, an unendurable sight, intense fear of persistence in the use of vision, as in the soldier suddenly blind in his sighting eye, or previous disease of the eyes that has caused the mind to dwell on the danger of blindness. These are all forms of autosuggestion, to which the patient, rendered oversusceptible by physical or emotional shock, is liable.

Equally important is the suggestion of previous organic blindness, which proved temporary; but, gradually clearing up, left the patient convinced that he still is blind. One of Hurst's patients wounded over the right occipital region, unconscious 5 days and then trephined, had suffered blindness of three quadrants of the visual field, retaining vision only in the right lower quadrant of each eye, as would be expected from such a wound. A month later this condition of the visual field was found, altho he complained only of deafness, which was believed to be hysterical. Nearly three months after his injury an attempt was made to cure the deafness by a pseudoperation—a cut behind the ear—and the positive assurance that it would restore his hearing. The blindness was still regarded as organic. There was some immediate improvement in hearing; but, quite unexpectedly, the vision became absolutely normal. It is easy to see how organic changes caused the limitation of the fields, and suggested the hysterical blindness that continued after the organic change had been recovered from.

It also is easy to see how a retrobulbar neuritis, or an injury to the eye, completely recovered from in a few weeks, might suggest a more permanent hysterical blindness of one eye. The late Dr. George C. Harlan reported a case (*Trans. Am. Ophthal. Soc.* v. 5, p. 328), of a man of 22, struck on the right eye with a stone ten years before. The eye had been blind ever since, and he had been advised to have it enucleated. Dr. Harlan found it normal, and demonstrated this to the patient. His surprise was equalled by his joy at

the discovery, and both were evidently genuine.

A source of suggestion of greatest practical importance are the attitude, prognosis and questions of the medical advisor. There can be no doubt that a gloomy prognosis has often fixed the hysterical disability. The investigation intended to elicit a symptom is pretty certain to give positive results in hysteria. Charcot found retraction of the field of vision, certain forms of cutaneous anesthesia and pharyngeal anesthesia the physical stigmata of hysteria. He looked for these symptoms and found them. Babinski, taking great care not to suggest them, found they were almost always absent. Hurst, using similar precautions, finds pharyngeal anesthesia no more common in the hysterical than in the normal. It has been demonstrated by various observers that the method of examination is largely or entirely responsible for "spiral contraction" of the visual fields.

"Blindness" is a term very loosely applied by patients. One says he is blind in one eye when the impairment of its vision is very moderate. Another asserts he is not entirely blind, altho all perception of light is lost. In hysteria, variations in what may be called "blindness" are particularly striking. It is very rare for all perception of light to be lost, as appears on close questioning, even tho this seems to be claimed in the first loose statement of the condition. This has to be reckoned with before we can be sure as to the condition really present, or the improvement in it that may have taken place. The nature of the interruption in the visual tract, upon which hysterical blindness depends, makes it probable that variations in the degree of impairment of vision occur. It is also probable that with a good many patients that claim amblyopia, a part of it is essentially hysterical. In this way the condition may be ranked as fairly common.

Hysterical blindness has doubtless furnished most of the cases of miraculous restoration of sight. A strong sugges-

tion, supported by mental and emotional excitement, is capable of effecting a cure. But cure can be effected by less spectacular means; and there is reason to think that such cures are more likely to be permanent. In some of Hurst's cases hypnotism was effective. But the measures generally most relied on were a full explanation to the patient of the condition present, and its certain curability, followed by every inducement to make the necessary effort to see, and to persist in the exercise of such visual power as he may find himself to possess, "explanation, persuasion and reeducation."

There is much in common between hysterical blindness and amblyopia from disuse. In either case an optimistic view of the outlook and persistent efforts to develop what vision there is will give the best results.

E. J.

FIFTY THOUSAND CATARACT OPERATIONS.

At the Wills Eye Hospital, Philadelphia, May 20, 1921, before a distinguished gathering of Eye Surgeons, Lt. Col. Henry Smith, I. M. S., now of London, England, completed his fiftieth thousand extractions of cataract, in the course of a clinic which embraced eighteen cataract expressions within two hours. The next day, at the Medico-Chirurgical Hospital, he did eight more, making twenty-six done in Philadelphia. A couple of days previously, he had four in New York. He then left Philadelphia for Cincinnati and a tour of the middle states. By and large, particularly large, he is the first man in the whole world to have had such vast experience with this operation and, no doubt, for a long time to come, will be the last.

We individualistic Americans cannot blindly follow even such a leader as "Jullunder Smith." We fully realize that anyone can criticise, while few excel in performance. But it seems to be the consensus of opinion of the principal cataract operators in America, that the operation as done and advo-

cated by Smith, is not adapted to our American practice.

We cannot accept the expression operation as performed by Henry Smith, as a routine procedure, and will not adopt his technic in totality, but we may adapt his methods in part to our personal peculiarities, with benefit to our patients. We certainly cannot afford to risk the very high percentage of loss of vitreous, which accompanies the typical "Smith Indian" operations. It is "safety first" with us; and, while a certain proportion of lenses come away easily in their capsules, where the lenticular ligament does not rupture readily, "stop, look and listen," give up the effort and proceed to capsulotomy!

We have, however, learned much from Smith, especially as regards the control of the patient, and of his eyelids, which tends to prevent the loss of vitreous. Most of us, too, have accepted the fact that the eye had better be left alone after operation until practical healing has been assured; and, therefore, such frequent dressings as were formerly made are not in vogue, altho we hesitate to leave the operated eye under the first dressing for ten days or longer, preferring to renew the dressing on the third or fourth day, at most.

H. V. W.

THE PRESIDENCY OF THE A. M. A.

The unanimous selection of Dr. Edmund de Schweinitz for president of the American Medical Association has a significance for American ophthalmologists greater than the success of the candidate of their choice, or the honor accorded to a personal friend. Ophthalmology was in many ways the pioneer specialty in medical practice. Medicine and surgery had been recognized as divergent branches of general medical practice, but the division of the profession into sharply defined specialties was long looked upon with disfavor.

However, American ophthalmo-

gists organized the American Ophthalmological Society in 1864, and fifteen years later secured, with the Oto-laryngologists, a special section in the American Medical Association. In these organizations they went ahead and did good scientific work, without asking any special favors from the rest of the profession. But before it had been organized many years, it was evident to those who watched closely that the Section on Ophthalmology was one of the best organized in the A. M. A., had uniformly good meetings, and often took the lead in adopting improved methods.

Still the principal offices of the Association were awarded to the surgeon, the members of the Section on Medicine, or the head of one of the Government Medical Services; and the "specialist" was scarcely considered in connection with them. This practical relegation of the ophthalmologist to a limbo of semiprofessional recognition was never relished, but those on whom it was inflicted did their share of work for the medical profession and quietly waited their time.

When last year the Section on Ophthalmology put forward a candidate of exceptional personal popularity, and unexceptional ethics, whose work in scientific investigation, and literary activity, and whose charm, thoroness and progressiveness as a teacher, and efficiency as an organizer, made him in every way worthy of the position; the House of Delegates could scarcely do otherwise than recognize that the claim of the Section to such a disposal of the honor was in every way just; and when this was recognized it was most gracefully accorded.

Doctor de Schweinitz has been in practice for over forty years, especially interested in ophthalmology from the first. His record is so well known to our readers that any detailed account of it here would be out of place. We can all rejoice in the recognition that has come to him, and thru him to our branch of the medical profession.

E. J.

BOOK NOTICES.

The Psychology of the Special Senses and Their Functional Disorders. By Arthur F. Hurst, M.A., M.D., F.R.C.P. Physician and Neurologist to Guy's Hospital. 134 pages, 29 illustrations. London and New York, Oxford University Press.

This small volume contains the "Croonian Lectures" delivered before the Royal College of Physicians of London in June, 1920. They deal with a subject old as the history of medicine, but usually spoken of in this volume, as elsewhere, as "hysteria." The author points out that the etymology of the word colored all the earlier theories of the nature of hysteria. But since it is universally in use to designate a definite clinical condition, it is no more improper to use it in its present sense than to use such words as chorea or rheumatism, which have equally lost their original significance.

Hurst defines hysteria as "*a condition in which symptoms are present which have resulted from suggestion and are curable by psychotherapy.*" He admits that he formerly held that hysteria was "an abnormal mental condition in which the individual is unduly prone to develop symptoms as a result of suggestion." But the experiences of the late war have taught us that, "given a sufficiently powerful suggestion, there are probably no individuals who would not develop hysterical symptoms." From this latter postulate it follows "that hysteria is infinitely more widespread than has generally been supposed." The explanation Hurst offers of hysterical symptoms "is that the structural basis of the psychological act of attention consists in some change which leads to a diminution in the resistance offered at each synapsis of the sensory tract. Perhaps this is in the nature of a throwing out of dendrites, or it may depend upon some biochemical change in the material which occupies the space between the dendritic terminations of adjacent neurones."

As the book is based largely upon work done in military hospitals, it is natural that the illustrative cases are

drawn from young men in excellent general health and previously free from any suspicion of special suggestibility; and perhaps on that account more capable of complete and permanent cure.

The chapters into which the book is divided are headed: I Nature of Hysteria, II Cutaneous Sensibility and Cutaneous Anesthesia, III Pathogenesis of Hysterical Cutaneous Anesthesia, IV The Superficial Reflexes in Hysteria, V Sensibility and Reflexes of Mucous Membranes, VI Cutaneous Hyperesthesia, VII Hysterical Pain, VIII Hearing, Listening, and Hysterical Deafness, IX Hysterical Hyperacusis, X Seeing, Looking, and Hysterical Blindness.

The last chapter, which is considerably the longest (34 pages), is naturally of greatest interest to the readers of this journal. In each of the earlier chapters, Hurst makes much of the importance of attention in rendering it possible for the impressions made on particular sense organs to affect the consciousness. "In order to feel, one has to pay attention. If the whole mind is absorbed with one's thoughts, tactile and other cutaneous stimuli will not be felt." "Inattention during a dull sermon results not only in absence of perception of the words said, but of a total deafness to the sound of the preacher's voice." Thus he goes on: "In order to see it is necessary to look. Looking involves a process in the visual tracts strictly comparable to what occurs in the auditory tracts in listening." "It is common enough for visual impulses to be so blurred that a man, wrapped up in his own thoughts, does not see the approach of a friend, but he would always avoid obstacles if he were walking, and he would be aroused by the sudden approach of an object to his eye; the latter would also give rise to the flinch reflex."

"In the condition of stupor, which was not uncommon in soldiers who had been exposed to exceptionally terrifying ordeals, the mind appeared to be so completely absorbed with thoughts which had no connection with the patient's present surround-

ings that he did not respond to any impulses from the outside world. He appeared to be blind, deaf, and anesthetic; he gave no flinch (visual-motor) or jump (auditory-motor) reflex; cutaneous (tactile-motor) reflexes were often tho not invariably abolished, and the pupil contracted sluggishly or not at all on exposure to light."

It is often believed that the "flinch reflex" may be inhibited by the malingerer, and likewise in hysteria; but absolute loss of the light reflex has usually been accepted as evidence of blindness from organic disease. One of the cases reported by Hurst proves that the reflex to light may be quite absent in hysteria. This man suffered from shell shock in 1914, rapidly became totally blind, was discharged from the service with a pension for complete blindness, and continued to live as a blind beggar for over three years. The pupils were widely dilated with no trace of reaction to light. The flinch reflex was completely absent. The first treatment consisting of two hours explanation of his condition and encouragement to use his eye, brought some sight and a return of these reflexes. Next day V=6/24, and the day after 6/12. Four months later he was at work as a watchmaker and gramaphone repairer.

The book is furnished with a table of contents and index. The illustrations are chiefly diagrams of areas of anesthesia, fields of vision, nerve connections and reproduced photographs, showing patients with hysterical paralyses and spasms, and of the same patients after their cure. In one case the second photograph is taken after a half hour's treatment which effected a complete cure. This was a case of blepharospasm, ptosis, and amblyopia of five months' duration.

The book is one of great interest to all active practitioners of medicine, for it throws light on a condition with which all must deal, and most find obscure and annoying. The title given to it is not without value for it points the way toward a fuller and more practical understanding of the subject.

E. J.

Radiant Energy and the Ophthalmic Lens, by Frederick Booth, Introduction by Whitefield Bowers, A.B., M.D., formerly Major, M.C., U. S. A., 230 Illustrations, 226 pages, Philadelphia, P. Blakiston's Son & Co.

This is a book on applied optics treated in a way that makes the reading of its pages a real delight, for the author is a novel writer, a painter with words and a descriptive analyst of character.

His chapters on Radiant Energy, which include the etheric impulses, the sound and heat waves, as well as molecular motions, are illuminating to a degree. The purely optical part of the book explains in succinct and varied language the applied scientific principles. The physiology of vision is clearly given. The refraction, accommodation and muscle balance, the various tests for ametropia, including what is rare in a book written by a layman, the necessity for cycloplegia, are shown.

Then come some purely optical data and a chapter on mathematics, all of which are pertinent to the subject. One hundred eighty-nine diagrammatic and other illustrations are given.

The book is welcome and recommended as a guide to applied optics, not only for the beginner, but for the busy practitioner as well, who will find useful data for practice, not so well collated in other more pretentious works.

H. V. W.

The object of this book is to present from a didactic standpoint a study of the principles of optics, also the eye from an optical standpoint, accommodation, convergence, tests, ophthalmoscopy, skiascopy; refraction, the ophthalmic lens, transposition of prescriptions, fitting of frames, etc. The division of the subject matter in paragraphs with headlines of heavy type facilitates orientation and renders the concise compendium very useful for reference. There are a great many, mostly schematic, illustrations.

C. Z.

This book contains many definitions and explanations that are not to be found in works that usually come to the attention of the ophthalmologist. The larger number of these are packed into the chapter on Radiant Energy. For instance, we find here a good account of diffraction, one of the polarization of light, the cathode rays, and Einstein's gravitational theory on light. These paragraphs represent wide reading and a great deal of study. The statements they contain are clear but very brief. Taken apart from the discussions that usually lead up to them, they make the chapter seem fragmentary. Without careful reading and a good deal of thought, such statements may not seem so clear to the unaccustomed reader as they are to the author, who has worked up to them by prolonged study.

The diagrams used thruout the work are clear, simple, and always explanatory. An unusually complete index may compensate for the somewhat irregular arrangement of the matter contained. On the whole the book is well worth having, if only for the unusual data and discussions it contains.

E. J.

Précis d'Ophthalmologie. Dr. V. Morax,
Ophtalmologiste de l'hôpital Lariboisière, Paris. Third edition revised. Small 8 vo., 890 pages, 435 illustrations and 3 colored plates. Paris, Masson et Cie.

The word précis, as here used, is best translated as compendium or epitome; and in this sense is exactly expressive of the character of this work, which seems to be one of a series of such volumes issued by its publishers.

The size of the page, 12 by 19 centimeters, and its rounded corners make the volume convenient to carry, but the weight of nearly 900 pages somewhat offsets the advantage of this form.

The arrangement of the text is in twenty-five chapters. The first is devoted to a brief scheme of clinical examination and a good account of general operative technic. In the main, the division of matter is similar to that

of most text books published in English. But the plan has been followed of giving an account of the injuries of each part, and also the tumors affecting it, in the chapter devoted to its diseases. Thus under diseases of the cornea, after 3 pages of general symptomatology, congenital conditions are taken up. Then follows an account of corneal injuries. The third heading describes the infectious lesions of the cornea, miscellaneous conditions follow, and the last topic is tumors of the cornea.

After thus dealing with diseases of the various parts of the eye, Chapter 16 takes up methods of measuring refraction; Chapter 17, errors of refraction; Chapter 18, disorders of accommodation.

The remainder of the chapter headings illustrates a somewhat different arrangement of matter from that ordinarily followed in English text books. Chapter 19, affections of the optic nerve; Chapter 20, disorders of the intracranial apparatus concerned in vision; Chapter 21, affections of the neuromotor apparatus and of the eyeball. This chapter includes methods of examination, congenital disorders (nystagmus, palsies), traumatic lesions of the ocular muscles, and nervous oculomotor syndromes. Then follows a section on strabismus and nystagmus. In Chapter 22, the ocular symptoms of affections of the central nervous system are considered. Chapter 23 deals with diseases of the orbit, altho previous chapters have considered the eyebrows, lids and lacrimal apparatus. Chapter 24 is given to ocular complications of sinusitis, and Chapter 25 to the relation of ophthalmology to social organizations, as to accidents of labor, inspection of schools, care of the blind, and vision required for various services.

In an appendix are given a series of therapeutic formulas and methods. There is a particularly full index, as well as a detailed table of contents.

If one wishes to get acquainted with the ophthalmology of France, or become familiar with the French language and methods of stating facts,

no better book for the purpose could be suggested.

The illustrations admirably explain and supplement the text. Perhaps, the chapter on neuromotor disorders is most likely to prove valuable to the American reader. It describes methods of diagnosis not generally brought before him; as the determination of the field of vision and the measurement of squint by the perimeter, the diploscope of Rémy and its modifications, etc. The colored plates are taken from Polack's *Atlas*, and present a representation of 18 ophthalmoscopic appearances.

A book of this character gives little scope to the individual tastes and attainments of its author, but we note that plastic surgery and bacteriology are rather more fully treated than in other works of similar character and size.

E. J.

Transmission of Radiant Energy by Ophthalmic Glasses. By Charles Sheard, A.M., Ph.D. 84 pages, 79 illustrations. Chicago. Cleveland Press.

This is a reprint from the American Encyclopedia of Ophthalmology, which offers in convenient form an excellent account of a subject now of particular interest to the ophthalmologist. It is divided into four chapters, the first of which gives a very interesting account of radiant energy; the second treats of common methods of producing and investigating the different radiations, ultraviolet, visible and infrared; Chapter 3 treats of the transmission and absorption of these radiations; and Chapter 4, the transmission of the ocular media.

The recent work of many investigators in the Nela Research Laboratory, the Bureau of Standards, the laboratories of Cambridge, England, and elsewhere are here drawn upon for their most important contributions to the subject.

Most of the illustrations are reproductions of the spectra, or graphs indicating the relative absorption and transmission of light and radiation most nearly similar to it.

E. J.

CORRESPONDENCE

CATARACT EXTRACTION

To the Editor: Dr. Vail has called my attention to the fact that in my letter on cataract extraction in the March issue of the *JOURNAL* I had not quoted correctly his article which occasioned my letter. A careful reading of his article shows that he advocates the extraction in the capsule or removing a goodly strip of the anterior capsule as better surgery than the old operation with the cystitomé, where the entire capsule is left behind, and especially so since the newer methods put an end to waiting till the cataract is ripe. I must apologize for having misinterpreted Dr. Vail's meaning, but my main contention still represents my own experience, namely that the operation for cataract extraction in which the capsule is opened with a cystitomé or other means, altho inferior to the method of removal of a portion of the anterior capsule by forceps, is not a method whose results deserve the severe criticism that Dr. Vail makes. It is also possible, in my experience, to satisfactorily extract immature cataracts by this method, if attention is paid to the proper removal of cortical debris.

Respectfully,
E. C. ELLETT.

TO THE SUBSCRIBERS OF AN INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.

Bulletin No. 1.

The Committees appointed by the American Ophthalmological Society, the Section on Ophthalmology of the American Medical Association, and the American Academy of Ophthalmology and Oto-Laryngology, met in joint session and effected an organization in New York City, October 21, 1919. Following this initial meeting, at which officers were elected and special committees were appointed, the general and special committees have met eight times.

As announced thru the journals, it was decided that invitations should be issued to all foreign countries with which we were in diplomatic relation-

ship March 6, 1920. English, French and Spanish have been adopted as the official languages of the Congress. Washington, D. C., has been selected as the place of meeting, and the time fixed by the Committee for the Congress is April 25 to 28, 1922.

The Committee on Organization, of which Dr. E. C. Ellett is chairman, has formulated rules and regulations to govern the Congress and, in general, has outlined the plans and policies under which the Congress will operate. It will arrange local committees for the entertainment of foreign guests in various parts of the country.

The Committee on Membership and Credentials, Dr. Walter R. Parker, chairman, divided the United States, Canada, Cuba and South America into censorial districts and appointed a chairman for each one. Four thousand and twenty-nine invitations have been issued to approved ophthalmologists of these countries. Up to the present time six hundred and twenty applications for membership have been received. From the offices of the chairman and secretary invitations have been sent to foreign societies and universities. Thru the Department of State, invitations to send official representatives have been forwarded to each of the foreign governments with which we are in diplomatic relationship.

The Committee on Arrangements, Dr. Wm. H. Wilmer, chairman, at the last meeting of the Committee, in Boston, reported final arrangements had been made with the hotels in Washington. The Willard has been selected as headquarters, in which all scientific meetings and exhibits will be held. In addition, the Committee is planning

for the entertainment of the guests, a reception by the President of the United States, a trip to Mt. Vernon, to the Bureau of Standards, the Congressional Library, etc. Plans for transportation at reduced rates, registration cards, badges and other details, even at this early date, are well under way. The Committee advises that hotel reservations should be made early. Further information can be obtained from Dr. W. H. Wilmer, 1610 I Street, Washington, D. C.

The Committee on Scientific Business, Dr. Edward Jackson, chairman, has announced that four morning sessions, from nine until one, will be devoted to the presentation and the discussion of papers, two afternoons will be devoted to the demonstration of new instruments, slides, specimens, etc., and two evenings will be reserved for addresses and demonstrations. The Committee has issued invitations in the three official languages to American and foreign confreres to submit contributions for the scientific program. Offers of papers, and suggestions regarding subjects to be discussed, or individuals to be invited to take part, should be sent to the chairman of this Committee, Majestic Building, Denver, Colorado.

Dr. Lee M. Francis, Chairman of the Committee on Finance, presented plans for the financing of the Congress.

Thus far, six hundred and nine paid subscriptions have been received by the Treasurer, and membership cards have been issued.

Office of the Secretary,
1529 Spruce Street,
Philadelphia, Pa.

July 15, 1921.

ABSTRACTS

Birch-Hirschfeld, A. Injury of Human Eye by Roentgen Rays. Zeit. f. Augenh. v. 45, p. 199.

A man, aged 28, who had lost his left eye 17 years previously, was treated with Roentgen rays for 10 days on account of choroidal tumors of his right eye. After 2 weeks the eye was inflamed and showed numerous small infiltrations of the superficial and deepest layers of the cornea, and indentations and sausage like dilatations of the conjunctival vessels. Vision reduced to fingers at 2½ mm. After 3 weeks the infiltrations were absorbed. Vision rose to 1 D. The same phenomena occurred after two further periods of treatment, with a corneal ulcer after the last one. The tumor seemed to be smaller.

The second patient, a man, aged 61, was treated by a radiotherapist with

Roentgen rays for a chancroid of the upper lid, without protecting the eyes. The chancroid was cured, but the eye had become very much inflamed, painful and blind, so that it had to be enucleated. It revealed absolute glaucoma, deep excavation, atrophy of the optic nerve, of iris and ciliary body, obliteration of the sinus, marked changes of the epi- and intrabulbar vessels and of the cornea, identical with the anatomic picture, as the author found it formerly in his experiments with animals.

He warns against Roentgen rays in glaucoma of seeing eyes, as this might be aggravated by the resulting vascular changes, and also in other affection, e. g. pannus, while he considers their application in painful blind eyes with hemorrhagic glaucoma, as recommended by Hessberg, as justifiable.

C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu. Volunteers are needed in other localities.

DEATHS.

Robert R. Brownfield, Phoenix, Arizona, was killed in an automobile accident, April 30, 1921.

Charles Manché, died February 15th, 1921, at Valetta, Malta, at the age of 75 years.

James Albert Meek, Norwalk, Connecticut, aged seventy-three, died May thirtieth, from cerebral hemorrhage.

Alfred Saenger, Professor of Neurology at Hamburg, died recently at the age of 61 years.

PERSONALS.

Dr. Otto Barkan has opened offices in San Francisco.

Dr. J. C. Edwards has located at Berkeley, California.

Dr. W. F. Blake of San Francisco is spending three months in Europe.

Dr. G. M. Van Poole, of Honolulu is located in the Young Building.

Dr. Charles Barton, Honolulu, has moved his offices from Emma street to Beretania street.

Dr. J. A. Morgan, Honolulu, is recovering from an infection of the arm.

Dr. F. M. Fernandez, of Havana, Cuba, has been appointed Assistant Professor of Ophthalmology in the University of Habana.

Dr. E. V. L. Brown, of Chicago, is spending the month of June on a motor trip to the Atlantic Coast.

The University of Nebraska has conferred the degree of Doctor of Laws upon Dr. Harold Gifford of Omaha.

Dr. L. Webster Fox, of Philadelphia will spend his summer vacation in Honolulu.

Dr. G. H. McCaskey, Indianapolis, announces that he is limiting his practice to ophthalmology with offices in the American Central Life Building.

Drs. Michael Goldenberg, Robert Von

Der Heydt, and M. Lebensohn have been elected to the surgical staff of the Eye department of the Illinois Charitable Eye and Ear Infirmary.

Dr. James A. M. Hemmeon, of Halifax, has been appointed a member of the Massachusetts-Halifax Health Commission, as a specialist on eye, ear, nose and throat in the health center.

Dr. Harry Vanderbilt Wurdemann, Major, M. R. C., U. S. A., Seattle, was in Washington, D. C. May 4-14 giving a course of lectures to the Army Medical School, on "Injuries of the Eyes." On May 9th he addressed the District of Columbia Medical Society on "Bright's Disease and the Eye—The Association of Ocular Lesions with those of Cardio-renal Disease."

Dr. Eugene Loring Bulson, who has been doing postgraduate work in New York City will return to Fort Wayne, Indiana about July 1st, to be associated with his father, Dr. Albert E. Bulson, Jr., in the practice of ophthalmology and oto-laryngology.

Dr. Karl Lindner, a former assistant of Fuchs and Meller, but now associated with Dimmer in Vienna, has been visiting a number of the larger cities in the United States. He recently spent a week in Chicago giving a number of lectures on trachoma, the newer bacteriology of conjunctivitis, and allied subjects before the ophthalmologists of that city. He addressed the San Francisco County Medical Society, June 17th on "New Facts Regarding the Bacteriology of the Mucous Membrane." At the Commonwealth Club Luncheon he addressed the Club on "Vienna, Past and Present." Dr. Linder is now in charge of the Central Hospital, Vienna.

On May 3rd the Cross of the Legion of Honor was conferred upon Prof. F. de Lapersonne of Paris. The amphitheatre of Panas' Circle was crowded with pupils, friends and colleagues, bearing sympathy and appreciation of his services to ophthalmology. Addresses were made by Roger in the name of the Faculty of Medicine, by Terrien speaking for his pupils, Abadie as the Dean of Paris Ophthalmologists, and others.

SOCIETIES.

At a meeting of the Pittsburgh Ophthalmological Society, held May twentieth, Col. Henry Smith delivered an address on cataract.

Dr. William M. Sweet, of Philadelphia, has been elected President of the American Ophthalmological Society.

The Colorado Congress of Ophthalmology and Oto-Laryngology met in Denver July 29th and 30th. The meeting this year had a good program and a large attendance.

The last meeting of the year for the Colorado Ophthalmological Society was held at Pueblo on May 21st. The Pueblo members entertained the members of the society at a dinner at the Minnequa Club.

At the annual meeting of the Illinois State Medical Society, held in Springfield, the Eye, Ear, Nose and Throat section elected as its officers for the coming year: President, Dr. A. H. Andrews of Chicago; Secretary, Dr. A. L. Adams of Jacksonville.

The Kansas City Eye, Ear, Nose and Throat Club entertained Colonel Smith on June 27th at a banquet at the Hotel Muehlebach. Colonel Smith spoke on his experiences in India. In the afternoon he operated upon several cases of cataract after his method in the Research Hospital and the General Hospital.

The following officers were elected to the Section on Ophthalmology of the A. M. A.: Chairman, Dr. Nelson Miles Black, of Milwaukee; Vice Chairman, Dr. A. E. Ewing, St. Louis; Delegate, Dr. C. D. Wescott, Chicago; Alternate, Dr. Harry S. Gradle, Chicago; Member of the Board of Ophthalmic Examinations, Dr. Walter B. Lancaster, Boston.

A special invitation has been sent to Latin American physicians to participate in the International Congress of Ophthalmology which will be held in Washington, D. C., April 25-28, 1922. Dr. M. Uribe Troncoso, of Mexico and Dr. F. M. Fernandez, of Habana, have been appointed to fill places in the general organizing committee and the committee on scientific material. Spanish will be one of the three official languages of the Congress.

MISCELLANEOUS.

The California League for the Conservation of Vision has started a campaign in Southern California to eliminate incompetent practitioners and peddlers of glasses.

The Manhattan Eye and Ear Hospital was given \$2,500 in the will of the late Mrs. Julia Seligman. The Perkins Institute for the Blind, Boston, was left \$1,000 by the will of Fanny Coburn.

A special advanced course in Ophthalmology will be given in the University of Bordeaux by Professor Lagrange and his colleagues July 1st to 20th. There will be daily clinics and morning and afternoon lectures, largely devoted to diagnosis and therapeutic measures.

A course of extension lectures on ophthalmology in relation to trades and occupations was arranged in connection with the Post-Graduate School of the Royal London (Moorfields) Ophthalmic Hospital and given at the Royal Society of Medicine, Monday, Tuesday and Wednesday, May 23-25, 1921. Illumination by Mr. J. H. Parsons; Practical Illumination by Mr. L. Gaster, secretary of the Illuminating Engineering Society; Miners' Nystagmus, by Dr. L. Llewellyn; Injuries due to Penetrating Foreign Bodies, Mr. Charles Goulden.

The Board of the Faculty of Medicine of Oxford University has given notice that in the future candidates for final examination

will be required to submit a certificate of attendance at a course of practical instruction in ophthalmology, including not less than twenty meetings during a period of three months, at an ophthalmic clinic recognized by the Board.

Ophthalmologists in Chicago and vicinity enjoyed a veritable "Field-Day" on the occasion of Lieut.-Col. Henry Smith's visit to that city on May 26th. In the morning Col. Smith operated on fourteen cataracts at the Chicago Eye, Ear, Nose and Throat College, and in the afternoon on eighteen cases at the Eye and Ear Infirmary. The intracapsular method was followed in all cases; full reports of the results will be published later. About 150 ophthalmologists were present at the afternoon clinic. The apparent ease of performing this delicate operation under Col. Smith's practised hand, his sang-froid and nonchalance, evidenced by his smoking cigars much of the time while operating, was the cause of considerable surprise among the visitors. In the evening Col. Smith was the guest of the Chicago Ophthalmological Society, at a dinner attended by nearly 200 members and visitors. Col. Smith read a paper explaining his method of cataract extraction, and pointing out the advantages which, in his opinion, this method possesses over the old one.

In connection with a celebration recently held at St. Dunstan's Institution for the Blind, British newspapers gave considerable space to this form of welfare work. The London Observer contributed a very interesting article on blind people as portrayed by English writers of fiction. Many of the characters recalled are familiar to most of us, and at this time the mental attitude of the blind as well as the problems of their supervision and reeducation are receiving more scientific attention than ever before, it is particularly interesting to be again reminded of the varied mental attitudes of blind people as portrayed by observers of an earlier day.

Many of us will remember Stevenson's Pew, in "Treasure Island." His first appearance with the great green shade over his eyes and nose, and wearing a huge old tattered sea-cloak with a hood, that made him look positively deformed, gives a hint of something sinister, while his leadership of the other buccaneers as they search the inn, and his death outside its doors, add to the feeling of horror which he inspires. But perhaps the world of letters would have lost a thrilling episode if Pew had never been born.

A leading place among blind heroes or heroines should be given to Wilkie Collin's

"Poor Miss Finch." Its purpose was to exhibit blindness, not from the ideal and sentimental point of view but as it really is. Lucilla is an engaging figure, and tho we have to lament her affliction, we are to some extent consoled by that wonderful sharpness of perception which she, in common with many other blind people possesses. She moves about with confidence and grace, recognizes people almost as readily as if she could see them, and can almost detect the difference between bright and dark colors.

Nydia, in Bulwer-Lytton's "The Last Days of Pompeii" challenges comparison with Lucilla Finch. Her beauty and simplicity, her love for Glaucus and Ione, add greatly to the interest of the book, and she easily holds a place among the characters of fiction who win our sympathy.

Bertha Plummer in Dicken's "The Cricket on the Hearth," and her father Caleb's devotion to her is not likely to be forgotten either.

Dick Heldar, in Mr. Kipling's "The Light that Failed" loses his sight in the progress of the tale. The closing in of the blindness is powerfully told, and one can hardly realize that, darkened in mind as well as in body, he goes to his death in the Soudan.

Amyas Leigh, in Kingsley's "Westward Ho!," is suddenly blinded by a flash of lightning at the very moment when his vengeance is almost within his grasp, and the impression it leaves on the mind is not far removed from that purification by pity and terror, of which Aristotle spoke.

Stagg, the blind landlord in Dicken's "Barnaby Rudge," is a monster of villainy, who belongs in the same category as Stevenson's Pew. As we witness his visit to Mr. Rudge in prison, we both hate and fear him.

Wandering Willie, the blind fiddler in Scott's "Redgauntlet," rouses very different emotions. His appearance is always welcome, and we rejoice to learn that he touched the ground now and then with his staff, not in a doubtful and groping manner, but with the confident air of an experienced pilot, heaving the lead when he has the soundings by heart, he walked as firmly and boldly as if he possessed the eyes of Argus.

The author closes his survey of blind people in fiction with a hope that there may be truth in Wilkie Collin's statement in the dedication of "Poor Miss Finch," that the conditions of human happiness are independent of bodily affliction, and that it is even possible for bodily affliction itself to take its place among the ingredients of happiness.

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RADIUM PLUGS FOR THE DISSOLUTION OF ORBITAL GLIOMATOUS MASSES DEVELOPING AFTER EXCISION OF THE GLOBE.

BURTON CHANCE, M.D.

PHILADELPHIA, PA.

In the case of bilateral glioma here reported after enucleation of each eyeball the growth recurred in the orbit. Vigorous treatment with radium was followed by shrinking of the tumors and apparent cure, which continued after four months. Read before the American Ophthalmological Society, June 15th, 1921.

At the meeting of this Society, in June, 1920, in commenting on the reports of cases of bilateral glioma, I cited an instance of that malady occurring in a child under three years of age, who was succumbing, apparently, to the effects of the disease. The case was spoken of then because it was my desire to record an instance of the bilateral manifestation of the affection, and because it was feared the little sufferer could not survive even until I could visit him again, and therefore no further note of his case might be made. The child is alive today; in the autumn I excised his two eyes. Following the excision of the left globe the orbit became filled with a tumor mass. The orbit is now empty, and it is of the manner in which the orbit was relieved that I wish to speak especially.

In August, the profoundly cachectic child was brought to me suffering much pain; the two eyes being filled with the yellowish masses so commonly seen. By the middle of September these seemed ready to burst the globes. By the middle of October the enormously distended right globe protruded between the lids. It had ruptured, and, projecting thru the anterior segment was a dove-colored granular and pultaceous mass which became bloodstained at the slightest touch. Not until November 3, would the parents give consent for the removal of the globe; they could no longer endure

his agonized crying, and I was entreated to relieve the child. The eye was excised the next day.

The globe was freely movable; the tumor mass seemed not to have perforated the sclera, altho there was a small heaping of tissues as tho a mass were surrounding the nerve for a few millimeters up to the line of the cut across the nerve trunk. The orbit proved to be quite free from nodules; and, altho for several days the lids were bloodstained and edematous, a clean healthy socket has resulted.

In the meantime the progress of the disease in the left eye had begun to distend the lids and the globe protruded thru the fissure. I expected, or at least hoped for rupture of the anterior segment of the globe as had happened in the right. However, on November 20, the whole orbital swelling suddenly subsided, and the globe positively sunk into the depth of the orbit; it was clear that it had ruptured posteriorly. By November 25, the contents had begun to distend the globe again; already the intraocular growth had pushed the lens forward abolishing the anterior chamber, and the orbit and the lids were edematous.

On November 27, this globe was removed, but with difficulty because of nodular enlargement. An examination showed that masses extended from protrusions thru the sclera which had burst out at the temporal aspect of

the globe and filled the apex of the orbit. The nerve did not seem to be involved, as was apparently the case with the right eye, altho the stalk was edematous and thick.

The reaction which followed was severe; the lids continued ecchymotic and edematous for ten days; yet after the excision, the vitality of the child revived remarkably. Almost immediately he became stronger; his skin pliant, his hair glossy, his cheeks plump and rosy, and he had ceased his fitful crying.

His case went along uneventfully until about the middle of January, 1921, when it was discovered that the left orbit was filling up. Early in February the mass extended beyond the ridges, pushing the lids forward. On the 10th I requested Dr. W. L. Clark to employ radium for the dissolution of the mass in the manner I had known him to have used it in neoplastic growths which were unfit for surgical excision, as I did not wish to attempt the exenteration of the orbit. Into the mass on the left he inserted deeply nine large plugs, or "needles," containing radium, and, into the presumably unaffected tissues on the right, as a matter of precaution, he inserted five smaller and one large needle. These were retained for 20 hours. On the 12th of February the child was taken home from the hospital, as he could be cared for well enough at home.

The immediate reaction was intense. There was distinct erythema of all the lids which lasted a number of days. For several weeks the lids on the left were puffed; a more or less ichorous discharge, which at no time was offensive, came from the left orbit; yet, while the right lids were much irritated, there was no discharge from that orbit. By May 1, the swelling of the lids of the right had subsided entirely and the socket appeared to be free from any irritation. The left lids were still faintly edematous and a thin discharge continued to flow; the cavity, however, was as deep as that of the right. In neither cavity is there now anything unusual; the mucous sur-

faces have assumed the smoothness commonly supervening on the healing after excision of the globe. There appeared to have been only a dissolution; or, might one speak of it as, an involution of the orbital mass. Once the child was brought because of great distension of the lids which had been caused by the retention of the fluid, which immediately subsided when drainage was reestablished by the daily separation of the lids and the more frequent use of lotions.

There have been thus far no signs of metastases. The cervical, the parotid and the submaxillary glands are none of them enlarged, indurated or painful. The child has gained in weight and grown in height. His intelligence and interest in his toys and play, and in the events of the day as read to him out of the newspaper by his father evince a somewhat extraordinary precocity. He has an elder brother and a sister, and a younger sister born since he came under my observation; the eyes of all are healthy.

I regret that I cannot make a report of the pathologic study of the excised globes. On the day a few sections were cut of one segment of the right globe, the specimens were lost in the laboratory. A week ago one half of each globe was recovered, too late for me to prepare them for exhibition. The stained sections show typical glioma cells with numerous rosettes in the fields.

The plugs, or "needles," as they are called which were used are hollow, noncorrosive, nickel-steel cases, each 20 to 25 mm. long and 2 mm. thick, roundish with a tapering point, and an "eye," thru which thread can be passed and knotted to withdraw it easily and to prevent loss of the costly implement. Each contained 10 mg. of radium sulphate, a half mm. space existing between the radium and the casing. The parts of the implement are carefully welded and polished so that no leaking or corrosion with resultant loss of the radium can occur. Broken "eyes" can be replaced without damage to the radium.

The needles were forcibly inserted their full length directly into the soft tissues, separated a few mm. from each other, and one transfixated the mass. A special forceps-like applicator was used altho a small pointed hemostat might have served.

Radium emanations were employed in this manner a few years ago, but their use was abandoned because of the uncertainty of their power and the violence of their effects. It is well known that the radium substance emits what are called beta rays and others which are called gamma rays, and on living tissues these different rays have different effects. And further, there are variations in the powers of the qualities of the individual classes of rays. The "hardest" of the gamma rays are very penetrating, and they exert a powerful action on malignant cells, while the "softer" rays are effective where slow prolonged cell inhibition is desired. The difficulties attending the use of radium in metal containers have been greatly overcome by the composition of the metal employed in the hollow slender plugs which Dr. Clark has used for a number of practitioners in Philadelphia. These, as already stated, are composed of nickel-steel, which besides being noncorrosive, filters out the harder and the more deeply penetrative rays.

By the deep insertion of these "needles," containing from five to ten milligrams of radium sulphate, into malignant growths such as the orbital

masses spoken of in this report, the actions are more efficacious than can be obtained by capsules or plaques. The emanations can be used more accurately and in a smaller quantity than by the employment of a larger quantity, applied to the outside or inserted in capsule form into the tissues thru an incision. Moreover, in the use of such metallic needles; the entire quantity of radium is utilized in the tissues, whereas when radium is applied from the outside in capsules or plaques more than one half of the radioactivity is dissipated in the air.

It has been the experience of all of us frequently to find rapid proliferation and metastasis after surgical removal of masses in the orbit, following excision of a gliomatous globe. I have not seen a child recover, nor one live so long as this child has, when the orbit had been invaded; and in my experience, wide extension of the disease and painful death have always followed exenteration of the orbital cavity only too soon.

This history is not in anyway more striking than what, perhaps, might have been repeated in the experience of anyone of the Fellows of this Society. I have used the details only as a text upon which to build up a plea for the prompt employment of a remedy which can be used with every hope that the extension of so deadly a disease, as that which follows the proliferation of the neuroepitheliomata, shall be checked and life prolonged.

ELECTRICALLY TINTED OPTICAL GLASS.

SIDNEY L. OLSHO, M.D.

PHILADELPHIA.

This describes a method of giving optical glass definite protective power against ultraviolet radiations.

Optical Lenses are electrically tinted in an apparatus perfected by the Rosenthal Electric Laboratory.

American Optical Glass so treated assumes an amber tint the depth of which is increased in direct ratio to the distance, degree and time of the exposure.

The lenses are treated, after they have been ground and completely finished. Unlike ordinary tinted glasses these present clear edges, and an even color thruout, regardless of variations in thickness. A strong minus lens is not darker at the periphery nor is a strong convex lens darker at its centre. One-piece and fused bifocal lenses may have their reading portions left colorless. New or old lenses may be treated. The effect is permanent under ordinary conditions but may be removed by a high degree of heat. The refractive index remains unchanged.

THE PROCESS: A transformer raises the street current to the required voltage. Carefully insulated, it is conducted within a lead enclosed cabinet, housing a specially constructed hot cathode tube. Under the tube is a circular conveyor. On this are distributed numerous small rotating platforms each to carry a lens. The lens is conveyed beneath the tube and rotates as it is treated.

The tube is of extremely high vacuum. It shows no color when a high tension current (70,000 V.) is passed thru it.

The anode is cooled constantly by running water. The cathode is a filament of tungsten which is heated to incandescence by a low voltage current. The incandescent filament throws off electrons which impinge with great velocity upon the surface of the anode. A new energy, light, of very short wave length, is produced and penetrates objects of great density, in this case, the lenses. The latter

may be said, therefore to be treated by a form of light.

There are two meters, one on the switchboard, a second on the apparatus. The distance of a lens from the tube is under micrometer control. An automatic timing device regulates the length of a treatment. Results can be duplicated and colors matched.

The samples submitted for study to the Bureau of Standards were plane lenses, 2 mm. thick, of Bausch and Lomb Crown glass. They were treated 1½ inches from the source of energy.

SCHEDULE.

20 M.A. 70 KV 6 minutes=Shade A
20 M.A. 70 KV 10 minutes=Shade B
20 M.A. 70 KV 20 minutes=Shade C

"The transmission thruout the ultraviolet and visible spectrum of three samples of this glass is shown by the curves on the accompanying chart.

For comparison purposes, the transmission of a sample of colorless crown glass, (1.68 mm. in thickness) is shown on the same graph. A study of these in connection with those given in Bureau of Standards Technologic Paper No. 119* will afford a direct comparison of the protective properties of this glass and other glasses reported on in that paper."

The transmission curve shows absorption to be greatest at the violet end of the spectrum. The curve is continuous in the visible spectrum, hence color values are undisturbed. The Relative Visibility curve is cut almost straight across, hence there is an even reduction of the intensity of light reaching the eyes.

There is a disproportionate absence

*Bureau of Standards Technical Paper No. 119. A study made at the request of the Committee on Hygiene of the Eye of the Section on Ophthalmology of the A. M. A. See also A. J. O., v. 3, p. 688.

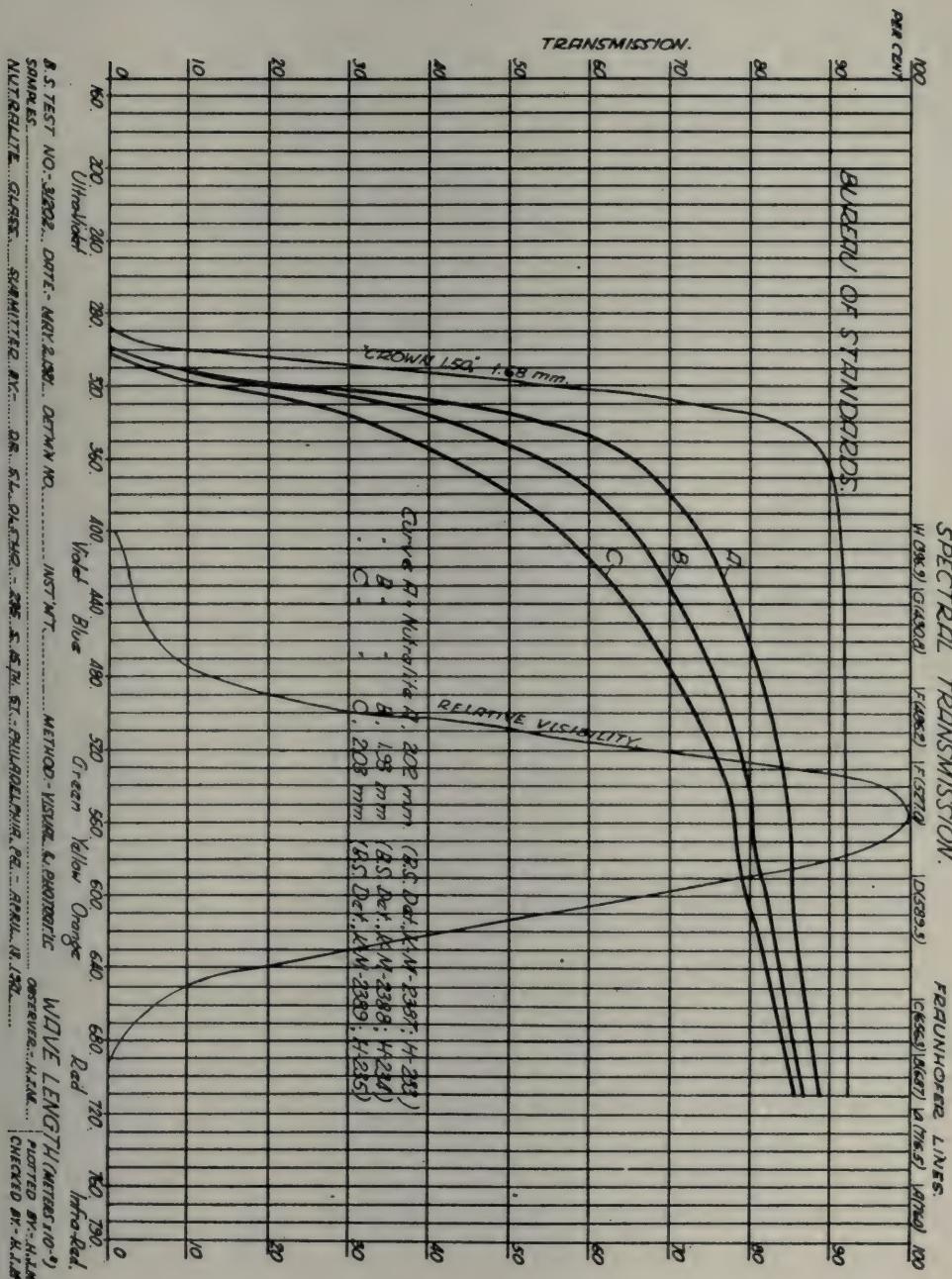


Chart showing transmission curves of three shades of electrically treated crown glass, as measured by the Bureau of Standards.

of visible color when the lenses are worn. No idiosyncrasy against uncolored lenses develops.

If German Optical Glass is subjected to this treatment it develops an amethyst cast. It then resembles the amethyst, sun-tinted, old window glass, the useful properties of which were described by Dr. L. Webster Fox, (J. A. M. A. 7-10-1909).

Fox predicted that an electrical method would some day be devised so

that optical glass, which is more perfect and better than window glass could be quickly tinted. He has persistently claimed that the ordinary amethyst lenses, as found on the market, are entirely different and inferior to lenses amethyst-tinted by the action of sunlight.

In turn it is claimed that American Optical Glass electrically tinted amber, is superior to German Optical Glass, electrically tinted amethyst.

PROTEIN IN THE TEARS AND INNERVATION AND SECRETION OF THE LACRIMAL GLAND.

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PASADENA, CALIFORNIA

This continues the discussion begun in a previous paper (A. J. O., v. 3, p. 802). The recent researches of J. Loeb are reviewed in confirmation of the action of protein content of the tears. The similarities of the innervation and secretion of the lacrimal and parotid glands are pointed out; and the views here expressed are applied to the better understanding of the etiology of xerophthalmia.

Jacques Loeb¹ has shown conclusively that the hydrogen ion concentration of a protein determines its reaction with acids, bases and neutral salts, while at a certain concentration there is no reaction. This is called the iso electric point. On the alkaline side of the iso electric point the protein reacts as an acid forming metal proteinates, while on the acid side of the iso electric point, the protein unites with the anion forming the protein salt. With neutral salts the same reactions occur, taking the cation in the first instance and the anion in the second.

It has been recognized for some time that van't Hoff's idea of applying the law of gases to the phenomenon of osmosis did not hold good for solutions of electrolytes. That is, that the process could not be explained purely on the basis of molecular concentration; and we are indebted to Loeb also for illumination on this subject.

He finds when water moves thru a collodion membrane attracted by an electrolyte in solution, it develops an electrical charge. This electrical charge in the case of a pure collodion membrane is usually positive and the attractive force resides in the negatively charged ion or the anion of the electrolyte. The attraction of the anion diminishes with concentration and the repulsion of the cation increases. The electrostatic forces are more nearly balanced in the higher concentrations, and further curves of attraction simulate those of nonelectrolytes in accordance with van't Hoff's idea.

Now if a protein film is interposed on this membrane, the behavior is completely modified in accordance

with the H ion concentration of the protein. When the H ion concentration exceeds a certain limit (iso electric point) the water assumes a negative charge, but on the alkaline side the water has a positive charge. The iso electric point of serum globulin is at the p H 5.52, of serum albumin at the p H 4.7. The p H of whole blood is 7.2-7.7, so we may say the normal state of the plasma proteins is on the alkaline side of their iso electric points. The p H of tears, I find to be about 7.2. When a tissue protein is exposed to atmospheric pressure, as is the protein film on the cornea, its alkalinity increases with the escape of the C O₂.

Loeb finds the swelling at a minimum at the iso electric point and an increase in the alkalinity increases the swelling within certain limits. It is safe to assume we are dealing within this limit in this case.

Loeb reports salts to have a depressing effect on the viscosity and swelling of proteins, while I reported an initial depression or retardation by 1.4% salt solution on the swelling of egg white with a subsequent augmentation. Since learning of Loeb's findings, I have repeated my swelling experiments many times and I herewith record findings confirming the original and amplified by contrasting normal salt with 1.4%.

Containers are eggs with the shell removed from the large end leaving the membrane intact. An opening is made on the small end to empty the contents. 5 cc. of egg white were then put in the egg membrane and egg shells placed in a wine glass containing the water or salt solution. The containers were tested for leakage

both before and at the conclusion of the experiment.

	5 c.c. container A (control) dist. water	5 c.c. container B dist. water	5 c.c. Cl NaCl	.7% Na. Cl	Time
	I	II	III	3	
1- 7.5 c.c.		7.0 c.c.	6.0 c.c.	6.0 c.c.	after one hour
2- 7.5 c.c.					
3- 7.5 c.c.					
1- 9.5 c.c.		9.0 c.c.	6.5 c.c.	8.0 c.c.	" two "
2- 9.5 c.c.					
3- 9.5 c.c.					
1-13.0 c.c.		10.5 c.c.	7.5 c.c.	10.0 c.c.	" four "
2-13.0 c.c.					
3-13.0 c.c.					
1-15.0 c.c.		12.0 c.c.	9.0 c.c.	12.0 c.c.	" six "
2-15.0 c.c.					
3-14.5 c.c.					
1-25.5 c.c.		20.0 c.c.	15.5 c.c.	20.0 c.c.	" 24 "
2-25.5 c.c.					
3-24.0 c.c.					

The control A contained white from the same egg in each series as B, and checks up variations in its swelling, but is seen to be very uniform; and while it slowed up in the 3rd series, this slowing is in favor of the conclusion in regard to salt action.

Egg white of course contains several proteins, but is particularly suitable in that they are for the most part of the simple variety and behave like those of the blood. Of course, this influence of the salt may be an expression of the behavior of the globulin-like protein, and it is very important to know more of this property of globulins if this be so, since globulin predominates in plasma.

The lacrimal gland possesses a double innervation like the salivary glands and herein lies the explanation of the dual nature of the glandular secretion in (1), a thick viscid protein fluid and (2) tears. Like the parotid, which receives its central nerve supply from the glossopharyngeal by way of the auriculotemporal branch of the fifth nerve, the lacrimal gland also receives its central innervation from the glossopharyngeal. The fibers are carried in the facial to the geniculate ganglion thence to the sphenopalatine ganglion by the great superficial petrosal nerve. From here they turn back in the second division of the trigeminal to the Gasserian ganglion, and go forth in the

first division of the trigeminal to reach the gland. It also has a sympathetic innervation².

In the case of the salivary glands stimulation of the nerves, coming from the brain (chorda tympani to the submaxillary and auriculotemporalis to the parotid), causes a vascular dilatation and the abundant secretion of a watery fluid. The character of the secretion is changed to a thick viscid consistency when the sympathetic is stimulated³. The same very likely is true of the lacrimal gland and explains the highly watery nature of tears and the thicker protein fluid ordinarily secreted. Stock² states that facial paralysis above the geniculate ganglion causes a suspension of weeping, but the moistening of the eye is unimpaired. This clinical observation supports the analogy.

The protein content of the lacrimal secretion has considerable practical application in the nourishment of the anterior layers of the cornea. The condition xerophthalmia, recently extensively reported by Osborne⁴, Mendel⁴ and Wason⁴, is relieved by feeding the fat soluble vitamin, or substances such as butter and cod liver oil. This disease is possibly much more frequent in man than we suppose. Its timely recognition is vital to preserve vision. Heine⁵ states it clears up like magic when fat and protein are included in a nourishing diet. Neglected, it leads to ulceration (marginal ulcer); and Wason⁶ from her pathologic studies states "The degree to which restoration is possible depends on the extent of the secondary injury."

Speculation as to why certain fats relieve this condition leads us to the fact that serum globulin, the predominating plasma protein, is precipitated linked with a lipin. Possibly then the chemical structure of the fat, when absorbed, is such that it is able to mobilize the globulin and bring it into the circulation*. Epstein⁷ reported an exceptional lipin content of

*Further investigations indicate that an action of vitamins is to alter the colloidal state of proteins whereby they become available to the cells of the tissues in question.

the blood in chronic parenchymatous nephritis, associated with an increase of serum globulin. The writer has noted a profuse lacrimal secretion in the same disease and the greasy ap-

pearance is unmistakable. Fuchs⁸ speaks of greasy islands on the conjunctiva in his description of xerophthalmia indicating insufficient secretion to cover the entire surface.

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SENIILE CATARACT EXTRACTION.

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This is the report of a comparative study of results obtained in 1,421 cataract operations performed in the author's private practice and the ophthalmic clinic of the University of Michigan. Presented to the Section on Ophthalmology of the American Medical Association, June, 1921. Published here by courtesy of the Journal of the A. M. A.

This report includes the results that I have obtained from operations for the extraction of senile cataracts in my private practice, together with those performed in the ophthalmic clinic of the University of Michigan from October, 1905, until January, 1921.

An attempt will be made to compare the results obtained by the various methods employed; and finally some of the more important features of the operation will be discussed.

In all, 1,421 operations were performed. The methods employed, together with the number of operations in each group, were: combined extraction, 1,013; simple extraction, 156; Knapp operation, 49; Indian operation, 91; after trephine operation for glaucoma, 8, and after preliminary iridectomy, 104, or a total of 1,421 operations.

In Table 1 is shown the total number of operations performed by various methods, together with the visual results obtained and the number and percentages of cases of loss of vitreous and the number and percentage of infections. The results are not classified

as success, partial success or failure, but by the visual acuity obtained in each case as recorded.

each case as recorded. These records of visual acuity are not accurate expressions of the results obtained. Many of them are the initial records made about two weeks after the operation was performed, while others are the final records, which in almost every instance were better than those first made. As the same discrepancy obtained in all the tables, however, a rough comparison may be permissible.

It is to be regretted that such a large number of cases must be tabulated as "not recorded." This is due in part to the fact that patients sometimes leave the hospital without reporting for refraction, and in part to an occasional incomplete record. From a record standpoint, this is especially unfortunate, as only the patients whose cases are most successful leave, while those with postoperative complications always remain.

It would be much more definite to tabulate results surgically, irrespective of visual results obtained.

TABLE 1.—VISUAL RESULTS OBTAINED WITH VARIOUS OPERATIONS.

LOSS OF VITREOUS.

All cases in which there was even a slight loss of vitreous are included in this report. The percentage of cases recorded in each of the various methods of extraction in which there was a loss of vitreous is given in Table 2.

It will be noted that loss of vitreous

TABLE 2.—PERCENTAGE OF CASES RECORDED WITH LOSS OF VITREOUS.

Type of Operation	Number of Operations	Number of Cases	Loss of Vitreous, per cent
Combined	1,013	109	10.7
Simple	156	10	6.4
Knapp	49	5	10.2
Indian	91	18	19.7
Preliminary iridectomy	104	10	9.6
After trephine operation for glaucoma	8	0	0.0

occurred more often in the Indian operation than in any other method of extraction (19.7 per cent), while the loss in the Knapp operation was slightly less than in the combined, from 10.2 to 10.7 per cent. The number of combined operations was much greater, however, 1,013 to 49 Knapp operations. The percentage of loss of vitreous for the total number operated on was 10.1 per cent.

INFECTIONS.

The percentage of cases recorded for each of the various methods of extraction in which infection took place is recorded in Table 3.

The percentage of infection for the total number operated on was 0.7 per cent.

TABLE 3.—PERCENTAGE OF CASES IN WHICH INFECTION TOOK PLACE.

Operation	Number	Per Cent
Combined	5	0.48
Simple	2	1.2
Knapp	0	0.0
Indian	1	1.1
Preliminary iridectomy	2	2.6
After trephine operation for glaucoma	0	0.0

In one of the cases in which a preliminary iridectomy was performed, there was a history of an old iridocyclitis. The eye had a subnormal tension, and the iris was bound down. It is possible that as a result of the operation, an old inflammatory process was lighted up and no new infection had occurred. As this could not be definitely determined, the case is included in the report as having been infected at the time of operation.

BACTERIOLOGY.

As two of the cases of panophthalmitis occurred before the time when a routine bacteriologic examination was carried out, the records are not complete in this regard. The findings in the cases examined were as follows: *Staphylococcus albus*, 2; staphylococcus and streptococcus, 1; xerosis and streptococcus, 1; pneumococcus, 2; Morax-Axenfeld, 1; reported negative, 1, and not examined, 2.

An effort was made to determine, if possible, the number of cases in which the visual acuity of less than 6/60 was due to postoperative complications, or faulty technic. To determine this, the

TABLE 4.—ACCIDENTS AND PATHOLOGIC CONDITIONS TO BE DEDUCTED.

	Combined Operation	Simple Operation	Indian Operation	Preliminary Iridectomy	Knapp Operation	After Trephine
Injury by patient	11	1	..	..	..	..
Vitreous opacities	26	1	1	6	2	..
Retinal detachment	6	..	2	1	1	..
Intraocular hemorrhage	4	..	..	..	..	..
Chronic uveitis	5	..	..	1	..	..
Chronic glaucoma	8	1	..	23	..	2
Corneal opacities	11	1	..	..	..	..
Optic atrophy	2	..	..	..	..	..
Choroiditis	2	..	4	..	2	..
Organized vitreous	2	..	..	1	..	..
Hemorrhagic retinitis	3	..	..	..	..	..
Atrrophic eye	4	..	..	1	..	..
Amblyopia	2	..	..	..	..	..
Retinitis pigmentosa	2	..	..	..	..	..
Intractable patient	2	..	..	..	..	..
Totals	88	5	7	34	5	2

number of cases in which a known pathologic condition or accident could account for the loss of vision was deducted from the total number recorded as less than 6/60.

Table 4 shows the number of accidents and pathologic conditions to be deducted from the number recorded as "less than 6/60" in each method of extraction.

The number of failures in cases recorded as less than 6/60, due to postoperative complications or faulty technic, is given in Table 5.

TABLE 5.—FAILURES DUE TO POSTOPERATIVE COMPLICATIONS OR FAULTY TECHNIC.

Operation	Vision Less Than 6/60	Acci- dents Known Patho- logic Con- dition	Failure in Cases Recorded as Less Than 6/60 Due to Postoperative Complications or Faulty Technic	
			Num- ber	Per cent
Combined	111	88	23	2.2
Simple	10	5	5	3.2
Knapp	6	5	1	2.1
Indian	13	7	6	6.5
Preliminary iridectomy	38	34	4	3.7
After trephine operation for glaucoma	2	2	0	0.0

It will be noted that in the Indian operation there was the highest percentage of failures, 6.5 per cent, in the Knapp operation the least, 0.2 per cent, and in the combined operation, 2.2 per cent. It must be mentioned that the patients on whom the Knapp operation was performed were all carefully selected, while those subjected to the combined operation included all who were unfit for any other procedure, except perhaps a preliminary iridectomy. The number of failures that resulted from the simple operation and from the preliminary iridectomy was about the same, being 3.2 per cent in the former, and 3.7 per cent in the latter.

A comparison of the various methods of extraction as regards both loss of vitreous and number of failures in cases recorded as less than 6/60, due to postoperative complication or faulty technic, is given in Table 6.

From this comparative study, it appears that in the Indian operation, there was a higher percentage of loss of vitreous and of failures due to acci-

TABLE 6.—COMPARISON OF VARIOUS METHODS OF EXTRACTION.

Operation	Loss of Vitreous	Failure in Cases Recorded as Less Than 6/60 Due to Postoperative Complications or Faulty Technic	
		No.	Per cent
Combined	109	10.7	23
Simple	10	6.4	5
Knapp	5	10.2	1
Indian	18	19.7	6
Preliminary iridectomy	10	9.6	4

dent and postoperative complications than was shown in any of the other methods employed. In the combined operation, there was the least percentage of failure due to accident or postoperative complications, while in the simple operation there was the smallest number of cases of vitreous prolapse. These percentages refer only to cases recorded as visual acuity less than 6/60, and not to the total number in which operation was performed.

While no attempt will be made to give all the complications that were encountered in this series of cases, a few of the more unusual ones will be mentioned, simply as a matter of record.

EXPULSIVE HEMORRHAGE.

There were three cases of expulsive hemorrhage, 0.21 per cent. This complication occurred in patients with advanced arteriosclerosis with high blood pressure. But there was no indication that a hemorrhage was more likely to occur than in any one of a large number of patients with equally severe symptoms on whom a similar operation was successfully performed. Whether or not hemorrhagic retinitis existed at the time of operation could not be determined.

CATARACT DELIRIUM.

Thirty-three cases of cataract delirium occurred in 1,421 extractions, 2.3 per cent. Of this number twenty-seven were males, and six were females. The average age for both sexes was 72. The youngest male was 51, and the oldest 81; the youngest female, 62, the oldest, 82. A history of alcoholic excess was given in eleven cases, 33.3 per cent.

DETACHMENT OF THE CHOROID.

Detachment of the choroid was noted in six cases, but as no careful study was made of the interior of the operated eye until the time of discharge from the hospital, this number does not in any way indicate the frequency of this complication. In all cases noted, with one exception, spontaneous reattachment took place. One patient was lost to observation before reattachment occurred.

COMMENT.

The combined operation with a conjunctival flap was performed more than twice as many times as were all the other operations taken together, and I regard it as the most satisfactory method of procedure in all but specially selected cases.

Unfortunately, the records were not complete as regards the number of times the iris prolapsed in cases of simple extraction.

A special study of a series of cases was made to determine the relative frequency of prolapse, with or without the use of atropin, before the time of operation. The results are given in Table 7.

TABLE 7.—FREQUENCY OF PROLAPSE IN CASES OF SIMPLE EXTRACTION.

Number of Cases	Without Atropin		Number of Cases	With Atropin	
	Number	Per cent		Number	Per cent
47	5	10.8	48	2	4.1

Since making this test, atropin is instilled routinely the night before the day of operation and repeated after the operation is completed, unless there exists some contraindication for its use.

The simple extraction was performed in young patients and in selected senile cases, in which the cornea was large and the iris well dilated.

The patients in whom the iris was left intact were examined on the day following the operation, and if a prolapse was present, an iridectomy was performed at once, no attempt being made to replace the iris.

That the Indian operation can be successfully performed in certain cases there can be no doubt. But when com-

plications arise, they are often of such a serious nature as to force many to the conclusion that the combined operation is a safer procedure to follow. I fully agree with Knapp, who came to the conclusion that "the lens cannot be dislocated by external manipulation alone, without in many instances subjecting the eye to greater pressure than seems wise."

After an experience comprising ninety-one extractions by the Indian method, I am convinced that in my hands the older operation, as a routine procedure, gives better results. To quote what I have said on a previous occasion, "This conclusion was reached, not after one attempt, but after several honest endeavors had been made to determine the relative merits of the two procedures, renewed efforts being prompted by the glowing reports of the enthusiastic adherents to this method of extraction."

The traction method of extraction as described by Knapp and Török, seems to offer the best method of extracting the lens in its capsule. It is safer than the Indian method, in that if the capsule is ruptured, the lens can be delivered in the ordinary way. The risk of loss of vitreous is less, and a distorted pupil or disturbance of the anterior vitreous rarely occurs. Thus the three cardinal complications of the Indian operation are minimized.

In this series, an attempt was made seventy-seven times to deliver the lens in its capsule by traction, and was successfully accomplished forty-eight times, 62.3 per cent. Vitreous was lost five times, 10.2 per cent. In six cases the resulting vision was below 6/60. In five of these cases there was a pathologic explanation, while in one case the failure was due to postoperative iridocyclitis. Of the five cases, two patients had dense vitreous opacities, one detachment of the retina, and two showed an advanced choroiditis. The iridocyclitis occurred in a patient, aged 51. This was the only attempt made to extract the lens in its capsule by traction in a patient below 60 years of age.

In order to make a comparative study of the visual results obtained in

cases of extraction after the Knapp method, an equal number of consecutive cases in which operation was performed by the combined method was taken for comparison. A second refraction was made in every case, and a secondary operation was performed if necessary. It was somewhat surprising to find that the average vision in each series was practically the same, about 6/10. In both groups, cases with any pathologic changes that could account for the diminution of vision were eliminated. There were thirty-nine cases of intracapsular extraction, and forty-one after the combined method, used for comparison. The exact visual acuity in each group was: Knapp operation, 19/30; combined operation, 21/35.

Whether or not it is wise to attempt to deliver the lens in its capsule as a routine procedure has not been fully established. Perhaps the posterior capsule has a protecting function not to be neglected. Certain it is that the fear of complications arising from performing a secondary operation after the Ziegler method is no argument in favor of resorting to any procedure that is more hazardous than the extraction with capsulectomy.

In this series of cataract extractions, a secondary operation after the Ziegler method was performed more than 200 times. While a perfect opening in the capsule was not always obtained, in not a single case, as far as could be

determined, did there occur a serious reaction or after result that made the case more complicated than it was before the operation was performed.

PRELIMINARY IRIDECTOMY.

A preliminary iridectomy was performed in cases in which the cataracts were developing equally in both eyes and when a useful vision could be obtained by the use of a mydriatic, also in cases known to have fluid vitreous, or in which the operation on the fellow eye had been followed by serious inflammatory reaction, and in all cases with even suggestive symptoms of glaucoma.

I fully appreciate that the many elements which enter into the successful management of cataract cases from an operative standpoint make it difficult to record results or draw accurate conclusions. It is possible, however, that as our knowledge increases, we may be able to make a choice of procedure that will lead to better average results. But it would seem for the present, at least, that any procedure must stand the test of comparison with the combined operation performed on patients selected with equal care.

The presentation of this series has been made possible thru the cooperation of the various members of the ophthalmologic staff at the University of Michigan during my entire service, and I wish to express my sincere appreciation of their valuable assistance.

HEREDITARY PTOSIS.

T. J. DIMITRY, M.D., F.A.C.S.

NEW ORLEANS, LA.

This paper reports a genealogy of five generations, thirty-eight individuals, of whom twenty-one showed blepharophimosis. It also discusses the surgical and social problems growing out of such a condition.

I wish to record twenty-one cases of hereditary ptosis observed in a known five generations. I shall not attempt to offer explanation for the occurrence of the variation, but will present clinical facts.

A review of the literature on hered-

itary abnormalities shows that conclusions are very often drawn from a limited number of cases and there appears a desire to have them garbed to laws of heredity. I would like to see some simple form of case report record adopted; it would act as a stimulus in the report-

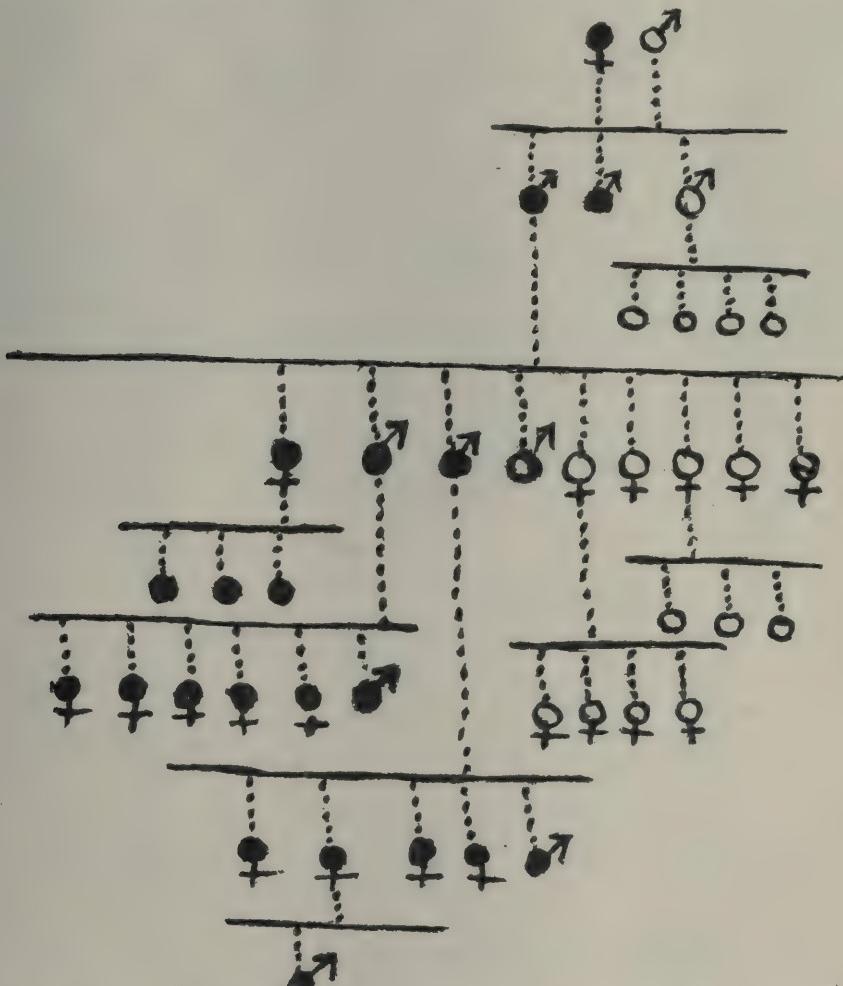


Fig. 1.—Chart showing family tree for cases of hereditary ptosis. Individuals affected are shown with a black circle, unaffected by the rings enclosing white. Females shown by cross below the circle, males by arrow point up and to right.

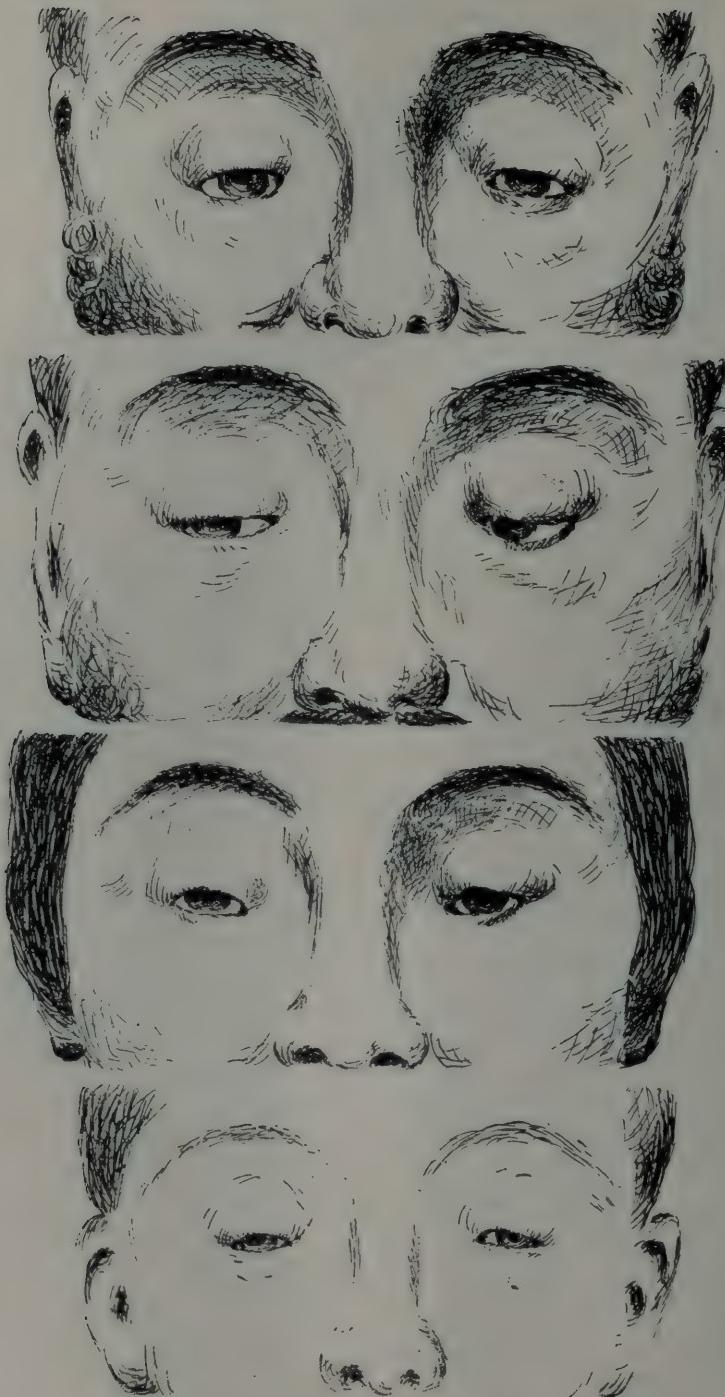


Fig. 2.—Four direct generations of hereditary blepharophimosis. (Dimitry.)

ing of many cases that are at the present time neglected.¹

It is unfortunate that many are not familiar with the excellent work that is being carried on at the Eugenic Record Office of Cold Spring Harbor, New York. They are collecting most valuable data and I am certain will assist in any statistical investigation. That

and merely increase confusion. Since the time of Aristotle, our trained biologists have been sincere in their study of heredity; and tho they have given us much valuable information, there is still a necessity for a greater number of case reports to assist in further progress.

BLEPHAROPHIMOSIS. The title of my



Fig. 3.—Three of Dimitry's cases of blepharophimosis showing appearance of deformity.

office is a department of the Carnegie Institute at Washington.

LAWS OF HEREDITY. Those writers, who affix these laws in explanation of their cases, have necessarily gained thru their research knowledge on a very interesting subject, but at best it is limited information gleaned from a mass of uncertainties. Because of these uncertainties, one is not justified, when dealing with but a few cases, in assigning them to any law.

The deductions are of little value

paper is hereditary ptosis, for under this heading it will be more readily recognized and assigned in the literature to its proper position. Blepharophimosis is the true condition, in my cases, and besides conveys a better understanding of the clinical condition. Blepharoptosis is from the Gr. *βλεφαρον*, the lids, and *πτωσις*, meaning to fall, a falling of the lids. Every condition in which the lids cannot be elevated is not due to a falling of the lids. Blepharophimosis: striction or stopping up. *φυμωσις* is a small palpebral aperture which is stretched horizontally.

CASES. The cases are considered as a whole for a description of one is true of the others. My cases are 1-2-3 and

¹ The Section on Ophthalmology, American Medical Association has a committee on the prevention of hereditary blindness, that is formulating a plan for its control. This committee might also include deficiencies.

4, shown in tree attached; the father, two daughters and a grandchild.

The cornea is of the usual dimensions and there is no paralysis of any of the recti muscles. Bony orbits are properly developed and of usual size. The lids cover from a third to half of the cornea. Slight elevation of lids occur when the muscles of the forehead are called into action. The palpebral apertures are small so that even by use of the fingers the lids cannot be made to uncover the cornea satisfactorily. The condition is that of a small aperture in which the lids are stretched over a properly developed bony orbit, and is constricted by its palpebral ligamentous attachment.

The problem considered ethnologically was negative. The first known member of the family was born in Syracuse, Island of Sicily. Tho the island has been overrun by many races; the Greeks, Goths, Byzantines, Saracens and the Normans, yet there is nothing in these different races which would account for the condition.

THE FAMILY TREE.—In this family genealogy of five generations there were thirty-eight living children, of which twenty-one showed blepharophimosis. The condition was not connected with sex, for there were eight males and eight females affected. The male and the female transmitted in equal numbers. It was never transmitted by a normal individual. Of the total males

seven had the disease and seven had not. Sketches 1-2-3 and 4 show four direct generations. The photograph shows cases 2-3 and 6.

THE PROBLEM IN EUGENICS.—The family skeleton was the dreaded "small eyes." I was first consulted, when case three was pregnant, for information as to the chances of her expected child. As the condition was a Mendelian Dominant, I could give but poor encouragement. I could only account for it as and assign it to some particular form operating thru a particular disorder and of direct transmission.

THE SURGICAL PROBLEM.—These cases demanded that they be handled quite differently from the usual ptosis, for the condition was not simply a dropping of the lids but an undeveloped palpebral aperture. The selected operation was a canthoplasty with a tenotomy of the palpebral ligament. I have operated on cases 2 and 3 and I have obtained much satisfaction. In order to obtain an increased effect in the canthoplasty I used a sliding bridge of conjunctiva.

CONCLUSION.—These cases, twenty-one in number in five generations, showed a condition often improperly diagnosed as congenital ptosis. The true condition was that of a congenital blepharophimosis. Had the usual surgical technic been adopted in correcting it, the results would not have been satisfactory.

THE SURGICAL TREATMENT OF COMITANT AND PARALYTIC STRABISMUS.

JOHN M. BANISTER, M.D., F.A.C.S.

OMAHA, NEBRASKA.

This paper describes its author's methods of operating for each of these forms of strabismus. It was read before the Sioux Valley Eye and Ear Academy at Sioux City, January 19th, 1921.

As the title indicates, this paper will be limited to a practical discussion of the operative treatment of squint, both comitant and noncomitant, or paralytic.

In all considerations of the treatment of squint, a sharp distinction must be made between the methods of surgical procedure in the cases of comitant and paralytic deviations respectively. In comitant squint the angle of deviation remains definite and fixed in whatever direction the eyes are carried with the object of fixation at any given distance; while in noncomitant or paralytic strabismus the deviation increases or diminishes, increasing as the object looked at is carried in the direction of the action of the paretic muscle and diminishing when carried in the opposite direction.

Comitant strabismus is limited to the two forms, internal and external squint, while in paralytic strabismus the deviation depends upon what muscle, or muscles, may be paralyzed. In constant comitant strabismus of long standing, the deviating eye is in the great majority of cases defective in vision, which is the result of the mental suppression of the visual image (*amblyopia ex anopsia*), or is due to congenital defects, or postnatal pathology.

In paralytic strabismus there is a very definite pathology involving the nerve of supply in its nucleus, along its trunk, or in certain of its branches of distribution. This pathology must be taken into very serious consideration when planning a method of treatment.

The views advanced in this paper relative to the operative treatment of strabismus are founded upon the writer's experience as an ophthalmic surgeon, extending thru many years, and will no doubt be found to be at variance in certain regards with the opin-

ions of writers generally considered to be authorities on the subject.

1. THE SURGICAL TREATMENT OF COMITANT STRABISMUS.

As before stated, comitant strabismus is limited to the two forms, internal or convergent squint and the external or divergent variety. While the scope of this paper will require an omission of the discussion of the various theories relative to the causation of comitant squint, it must, nevertheless, be noted that as a necessary preliminary to radical surgical treatment, the static refraction must be accurately determined under cycloplegia.

The refractive correction, constantly worn, may, in certain cases, secure a satisfactory cosmetic result, especially in young subjects with a marked error of the hyperopic type; and such correction by glasses should invariably be tried before operative measures are attempted. Of course it goes without saying that along with the use of the correcting lenses the usual orthoptic methods should be made use of in advance of operation, and this applies with especial force to the treatment of the young.

In cases, however, in which all of the usual preliminary measures have been tried, and the squint still continues, operative interference is definitely indicated in patients over five years of age.

(a). The surgical treatment of internal or *convergent strabismus*.

Before operating one should determine approximately the degree of deviation with a view to establishing some estimate of the extent of the operative procedure to be undertaken. The words "some estimate" are used advisedly, for it is absurd to hold that by determining mechanically, or subjec-

tively, the supposed degree of deviation of a squinting eye, the data so obtained will enable the operator accurately to gauge the amount of operative interference required, and to judge as to the exact number of millimeters a given tendon should be advanced or set back.

In the case of the functions of the ocular muscles, we are dealing with highly complex physiologic processes, which in strabismus have become disarranged to some extent it is true, but which, nevertheless, are to be taken into careful consideration.

Thus, while in the case of one patient with an inward deviation of seemingly 20° (about 40 mm. linear measure), a careful complete tenotomy of the internal rectus muscle may secure a perfect cosmetic result; in another individual under exactly similar conditions, as far as can be determined, only a comparatively moderate change in the angle of convergence may result from the same operative attempt. The ophthalmic surgeon, in fact, cannot operate upon hard and fast lines in his strabismus cases, but must consider every patient a law unto himself and must be prepared to meet unexpected conditions as they may arise. Given a case of convergent strabismus, upon which operation is indicated, the following method of operating is advised:

Under local anesthesia, which is indicated in all patients over fifteen or sixteen years of age, a very careful complete tenotomy of the internal rectus muscle of the squinting eye, close to the sclerotic insertion, is performed. The separation of the tendon from the globe at this point must be complete, all strands of muscular tissue being divided with as little interference with the relations of the muscle to Tenon's capsule as possible. Any such interference as clipping the connections of the muscle to the capsule is to be condemned.

If, after such a carefully performed tenotomy, the cosmetic effect desired has been obtained and the internal rectus muscle is found to have preserved its control over the globe, the opera-

tion may be considered satisfactorily performed, and there only remains the closing of the conjunctival wound with silk sutures. If, however, a manifest degree of squint still remains, the correction of the remaining deviation should be secured by an immediate advancement, or tendon shortening operation, upon the external rectus muscle of the same eye. Under no condition should an increased effect be sought by separation of the belly of the muscle from Tenon's capsule during the performance of the tenotomy. The use of the usually recommended stitch to increase the effect is not advised.

The method of operating recommended may be criticised as being at variance with the views of certain authorities², but the writer has been in the habit of performing this double operation at one sitting on the same eye for the last twenty two years with most satisfactory results.

If, however, the primary division of the tendon of the internal rectus results in an over effect, this must be controlled by the immediate use of a correcting suture. The form of suture, which the writer can thoroly endorse, is the following: A ten day chromicized catgut mattress suture, size OO, is so introduced that the base of the suture is located in the belly of the muscle close to the cut end and in the overlying Tenon's capsule, and the two free ends are passed deeply thru the remnant of the attachment to the sclera left in consequence of the division of the tendon. This suture will enable the cut end of the tendon to be drawn towards its former attachment to the proper degree, and, when the free ends are tied, the entire suture will remain unabsorbed for a sufficient time to permit of a firm attachment of the tendon to the globe in its new position.

Since this is a practical surgical paper, it would seem appropriate to describe here the tendon shortening, or "tuck" operation referred to, which the writer has habitually performed since 1898. The "tuck operation," which in the writer's hands has proved eminently satisfactory, is the operation brought forward by Dr Francis Valk

of New York in 1897 with certain modifications. In this operation, the tuck is made with a single mattress suture of "O" or "OO" chromicized catgut and left buried, the flap of Tenon's capsule and conjunctiva being united over it by silk sutures, of which two are generally sufficient.

In performing this operation, I have found attention to the following points essential: (a) The careful freeing of the tendon from Tenon's capsule and separation of the belly of the muscle from the globe back to a point beyond the base of the mattress suture in order that the tendon may be permitted to slide forward when the suture is drawn taut to make the "tuck." (b) The passage of the ends of the suture thru the upper and lower thirds respectively of the attachment of the tendon to the sclerotic, embracing the dense episcleral tissue just at the tendon insertion, and the securing of a strong hold upon the belly of the muscle at the situation of the base of the mattress suture, by weaving the suture in and out as it is passed thru the muscle. These steps are necessary in order that the muscle, included in the base of the suture, may be brought sharply against the attachment to the sclerotic, and held there without slipping. In my experience in a great many cases, a tuck so placed has invariably held. These are modifications of the original operation suggested by practical experience at the operating table.

Another modification, which has been utilized by my colleague, Dr. H. B. Lemere, and myself, is the following, which we have found very useful. If after drawing taut and tying the mattress suture, an insufficient effect has been obtained, an additional effect may be secured by rethreading the needle upon one end of the suture, which has been left uncut, passing the needle farther back thru the belly of the muscle, and then tying to the other end of the suture left *in situ*. This makes a supplemental tuck, which, in our experience, has always held firmly. The "hump" in the muscle resulting from the tuck atrophies in a very

short while and the tendon remains shortened in proportion to the amount of the muscle embraced in the mattress suture. This method has decided advantages over the usual technical advancement with a separation of the muscle from its attachment to the globe and with a reattachment by silk sutures at a point nearer the cornea. In the first place there are no sutures that can possibly cut thru the ocular tissues with a resulting slipping back of the tendon and loss of effect; in the second, the effect can be more accurately gauged and if not sufficient the accessory tuck can be utilized; and thirdly, since an absorbable material is used to make the tuck, there are no deep sutures to be removed afterwards³.

In the case of intermittent strabismus of the convergent form, it may be easily possible to secure a permanent curative effect by the performance of this tendon shortening operation alone upon the external rectus of one or both eyes, combined with the use of the correcting lenses when required by a refractive error. It is in such cases that the tendon shortening operation performed on the antagonist without tenotomy of the internal rectus, is especially indicated. In young children the operation for strabismus of whatever degree must be performed under general anesthesia, which is a great disadvantage as the results at the table cannot then be accurately judged.

(b) The surgical treatment of *external strabismus*.

In the effort to correct an external strabismus, a tenotomy of the external rectus muscle may possibly be successful but in the great majority of cases it is not. We cannot expect as much effect on the direction of the eye to follow a tenotomy of the external as in the case of the separation of the tendon of the internal rectus muscle. The insertion of the tendon of the former muscle is farther from the cornea than is that of the latter, and the effect of an operation, in the nature of a setting back of the tendon insertion, is in direct proportion to the nearness to the cornea of the normal muscular attach-

ment to the globe.⁴ Such being the case, in the great majority of cases of external comitant strabismus, the double operation on the squinting eye will be required, that is a tenotomy of the external rectus and a tendon shortening of the internus by the "tuck" method as described.

By the double operation on the squinting eye, as advised both in internal comitant squint when required and in external squint of the comitant type, in the majority of cases, the full effect is secured at one time, by one operation, on one eye, which is a most decided advantage.

2. THE SURGICAL TREATMENT OF PARALYTIC STRABISMUS.

In paralytic squint we are brought face to face with a positive pathologic state in each case. In considering the surgical treatment of such conditions, therefore, we must be careful to exhaust all therapeutic methods and to allow a sufficient time to elapse to prove that such means are hopeless before proceeding to surgical operation. A case of this type should not be operated upon in a shorter time than six months.

It may be stated as a general proposition that syphilis is responsible for the muscular palsy in fifty per cent of the cases. Other general diseases may stand in a causal relation; and focal infections may also play a definite part in causing such palsies, especially those resulting from infective disease of the accessory sinuses of the nose, and from apical infections of the teeth.

It goes without saying that an exact diagnosis of the type of the paralysis, and of the muscle, or muscles, involved must precede any operative attempt. Third nerve palsies are far more common than the other varieties, and in such cases we may find paralysis either of all the extrinsic muscles supplied by this nerve, including the levator palpebrae superioris, or of individual muscles supplied by certain branches. Paralysis may affect the superior oblique or external rectus muscles alone, due to a lesion involving the 4th or 6th nerve respectively.

Given a permanent palsy of the muscles supplied by the 3rd nerve with an external strabismus accompanied by ptosis, the writer would advise the following method of procedure: The ptosis should be corrected at least to the extent of uncovering the pupil. The Eversbusch or the Gruening operation will as a rule serve to meet this indication. It must be noted, however, that the Eversbusch operation is contraindicated where there is complete paralysis of the levator muscle.⁵

The correction of the external squint may be performed as a later operation, if a choice in this regard may be exercised; or the entire corrective measures, both as regards the paralytic deviation and the ptosis, may be done at one time either under general anesthesia or under local anesthesia with nerve blocking, which latter is to be preferred.

In performing this operation to correct paralytic squint, the writer first tenotomizes the external rectus and then secures the effect of an advancement of the internus thru the "tuck" operation before described. By this double operation the deviating eye can be directed straight forward and the distressing heteronymous diplopia, existing in the half of the visual field corresponding to the sphere of action of the external rectus muscle, can thus be relieved. If the internal rectus muscle is completely paralyzed, this is all that can be expected; but in some cases in which there is not absolute paralysis of this muscle, a surprising degree of converging power may be secured. This occurred in a recent case in the writer's practice, in which single vision resulted when looking outward, forward, and a little inward in relation to the affected eye.

In cases of this type, it is highly probable that the secondary contraction of the externus may still further compromise the action of the internus, thus causing this paretic muscle to lose all power of turning the globe inward even tho not absolutely paralyzed. When in such a case the secondarily contracted externus is tenotomized and the paretic internus ad-

vanced or shortened, the remnant of power remaining in the latter may be enabled to function to some extent.

The same method of procedure is advocated and practised by the writer in the case of internal squint due to paralysis of the external rectus, i. e. a tenotomy of the internus and a simultaneous advancement by the "tuck" operation of the externus to the extent of directing the eye straight forward.

In the case of vertical squint, hypertropia, or hypotropia, which forms can occur independently from involvement of the respective supplying branch of the 3rd nerve in each instance, or where deviations occur from paresis of the superior and inferior oblique muscles, the surgical indications are as follows: In vertical squint the paretic muscle should be shortened (advanced) by the "tuck" method. This may be sufficient to relieve the deformity and secure single vision. If not, we shall have to increase the effect. The writer would advise for this purpose a very careful tenotomy of the antagonist of the same eye, barely separating the tendon at its attachment and treating its connections with Tenon's capsule with great reverence.

If too much effect should be secured in this way, which will be more likely in the case of tenotomy of the inferior rectus after advancement or tendon shortening of the superior rectus, it will be easy to correct this over effect and to secure parallelism of the visual axis in the horizontal plane and below by applying the same catgut correcting suture advocated in the case of over-effect discussed under the surgical treatment of comitant strabismus of the convergent type. The effect desired can be accurately secured in this way, as I know from practical experience, and this effect may be expected to be permanent. Before dividing the muscular attachment to the sclera in tenotomizing either the superior or inferior rectus, it is advisable to pass the correcting mattress suture thru the belly of the muscle and thru the overlying Tenon's capsule, as one will thus have control of the tendon. In case an over effect should result from the tenotomy, the two ends of the suture

can be passed thru the remnant of the attachment to the sclera, and the muscle drawn toward its former attachment to the exact extent required. The ends of the suture are tied and cut short, and require no further attention.

The writer is well aware of the fact that very different methods from those advised in the case of squint due to palsies of the superior and inferior recti muscles⁶, have been advocated by men whom we consider authorities in ophthalmic surgery; and that he may be suspected of being the subject of a dangerous originality in the proposed advancement by "tuck" of the paretic muscle combined if necessary with tenotomy of the direct antagonist of the same eye supplemented by a controlling absorbable suture when required. Be this as it may, the fact remains that the result desired can be obtained most satisfactorily in this way with the operative measures confined to the strabismic eye and without interference with the sound organ in the way of curtailing its motility in certain directions to secure a compensating deviation tending to relieve the diplopia caused by the muscular palsy affecting its fellow. Thus for example in states of marked paresis of the superior rectus in either eye, Duane has advised a tenotomy of the inferior oblique of the other or sound eye, and this procedure has been quite generally endorsed.⁷ The writer is opposed to crippling the motility of a perfectly sound eye to secure relief from diplopia resulting from a paretic affection of the fellow organ, when a perfectly satisfactory result can be secured by limiting the surgical interference to the affected side as recommended.

In paralysis of either the superior or inferior oblique, however, this limiting of the operation to the affected eye is impracticable. In the case, therefore, of paralysis of the superior oblique, the inferior rectus of the sound eye should be tenotomized; and likewise, where a palsy affects the inferior oblique of one eye, the *superior rectus* of the other should be set back by a tenotomy. The purpose of the operator in both operations will be to create

in the sound eye in each instance a deviation which will correspond to that induced by the paralysis affecting the other eye, with a relief of the diplopia as the result.

*Fig. 1
Left.*



Paralysis of left inferior rectus.

In Fig. 1 and Fig. 2 the positions of the double images are represented in cases of paresis of the left inferior rectus and of the right superior oblique respectively, while in Fig. 3 and Fig. 4

*Fig. 3
Left.*



Paralysis of left superior rectus.

the positions are shown in instances of similar involvement of the left superior rectus and right inferior oblique.

It should be noted that the diplopia in the case of paralysis of the two oblique muscles is homonymous, while in involvement of the superior and inferior recti it is heteronymous.

In order, therefore, to relieve the diplopia, in case of paresis of the right superior oblique, the tendon of the left inferior rectus is set back causing the image in that eye (Fig. 1, L) to cor-

*Fig. 2.
Right.*



Paralysis of right superior oblique.

respond with that of the right or paretic eye (Fig. 2, R.)

When the right inferior oblique is paralyzed, the effect of a tenotomy of the left superior rectus will be to

*Fig. 4.
Right.*



Paralysis of right inferior oblique.

cause the image, L, in the left eye (Fig. 3) to correspond with the image, R, in the right, or paretic, eye (Fig. 4), thus relieving the diplopia.

The same relationship would exist, of course, between the superior and inferior oblique muscles of the left eye, and the contralateral inferior and superior recti respectively.

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CONVENIENT AND ACCURATE MEASUREMENT OF BLIND SPOTS AND SCOTOMATA.

EDWARD J. BROWN, M.D.

MINNEAPOLIS, MINN.

This paper describes the method used by its author and gives some illustrative cases showing the importance of the results obtained.

A great impetus has been given to the study of the blind spot and paracentral scotomata by the ingenious and skillful work of Haitz, Peter, Wells, Lloyd, Bissell and others. I was able to satisfy my own mind during 1918 that a modification of the Bjerrum screen was for such ordinary workers as myself, a more practical proposition. An expensive stereoscope with wide angle lenses as used by Lloyd and Bissell may have certain advantages; but my impression is that, in view of the fact that the determination of the limits of small scotomata with a one or two millimeter object and a very short radius, requires almost as much nervous tension on the part of the surgeon as a cataract extraction, its advantages are more than offset by a well lighted Bjerrum screen with a proper size of test object. This can be used at two meters with perfect comfort to both surgeon and patient.

For peripheric field taking and the coarse mapping of scotomata beyond 25 degrees my triplane perimeter described in 1917 (American Academy of Ophthalmology and Oto-Laryngology) is convenient and satisfactory. For the blind spot and paracentral scotomata my map constructed on rectangular lines after the Haitz charts, but adapted to a radius of two meters seems to me ideally practical and sufficiently accurate. To secure the advantage of binocular fixation, I have the patient look with the eye not under test at the fixation point thru a truncated cone 15 cm. in length with the small end about 1.5 cm. in diameter. With the majority of patients this is a decided help.

The map is very simply and easily made of brown shade cloth of thirty inches vertical and thirty-six inches horizontal measurement, with a slat at top and bottom and a large eyelet to

connect with a strong wire hung from a picture moulding. The fixation point being at one side of the map, we have 36 inches (91.2 cm.), the tangent at two meters of 24 degrees. At 15 degrees the tangent is 21 1/8 inches (53.589 cm.), at 16 degrees approximately 4 cm. more, and the vertical distance for five degrees is approximately 4.5 cm., which will give about thirty five degrees above and the same below the horizontal. Inside ten degrees (length of tangent 13 7/8 inches or 35.26 cm.), the horizontal lines are for 10 instead of 5 degrees, which gives a fairly accurate and very convenient scale for mapping paracentral scotomata. As the map is reversible it is adaptable to the blind spot of each eye and to both sides of the point of fixation. Writers differ as to the dimensions of the normal blind spot of Mariotte. I have eight inches horizontal and ten inches vertical (20 by 25 cm.) as about the normal for two meters.

I am free to confess my ignorance of the significance of the enlargement of the blind spot in general, but I am confident that it is a very prevalent condition, and that it probably means a disease of the eye and of other associated organs in a far greater number of cases than is generally recognized. It is commonly believed to be an important symptom of glaucoma, but I have seen a number of cases where the enlargement was greater in the less glaucomatous eye. For example a Jewish tailor had been treated for attacks of subacute glaucoma by Dr. Scales of Pine Bluff and Dr. Levinsohn of Chicago and has had numerous attacks since coming under my care, all in the left eye. The right blind spot was decidedly larger in 1919 when measured on my map following an at-

tack of right acute antrum suppuration, and the same was true of the blind spots taken stereoscopically in 1918.

meters, the left nearer normal. In September the tonsils and adenoids were removed, the former very foul, the latter having an abscess 5/8 inch

NAME E.B.

DATE 5. 1. '21.

RECORD FOR BROWN SCOTOMA
AND BLIND SPOT MAP AT
2 METERS

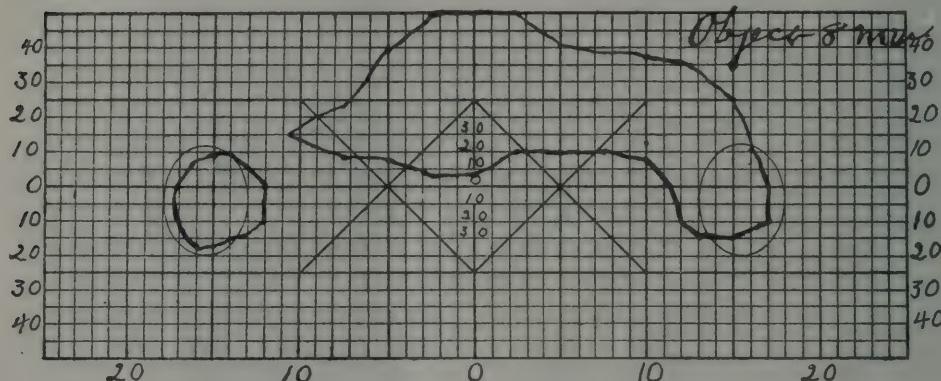


Fig. 1.—Chart of fields showing right paracentral scotoma, left practically normal blind spot.

A few other illustrative cases may be worth mentioning. F. R. F., 18, complained of asthenopia in 1918, had one quarter D. astigmatism and bad tonsils and adenoids. The blind spots were both very large and the right of irregular contour. In 1919 the right was still larger, 12x18 inches, at 2

in diameter and both very large. On April 26 of this year the left blind spot was normal in size and the right nearly so.

E. B. 70, with two diopters plus astigmatism and 20/15 corrected vision has had disease for many years of the right antrum and ethmoid. The left B.S. is

NAME Mrs. J. C. G.

DATE 4. 29. '21.

RECORD FOR BROWN SCOTOMA
AND BLIND SPOT MAP AT
2 METERS

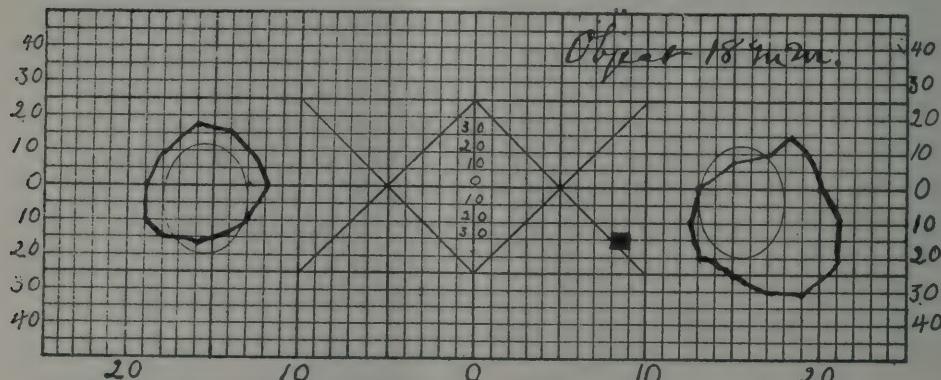


Fig. 2.—Chart of fields showing enlarged blind spots in both eyes with small scotoma in the right.

practically normal and there has been for some years a large paracentral scotoma of the right as shown in the accompanying chart.

Mrs. J. C. G. 61, came to me lately for a change of lenses. Corrected vision 20/30, when I had previously seen her in 1896, 20/15. At the earlier date I had treated her for what I considered specific rhinitis. There had been no other symptom of lues. At the late visit the Wassermann was negative, and the woman in good health. The corneas were moderately anes-

thetic, the anterior chambers shallow and the temporal discs cupped. Tension 31-24. The form fields were considerably contracted, for blue and green markedly so. Saturated red was seen as pink at the point of fixation in the right and in the left as red for about five degrees. The blind spots were both enlarged, especially the right, and the scotometer part of the map revealed a very small scotoma in the right inferior outer quadrant on the 30th meridian and between the 8th and 9th parallels.

TREATMENT OF DETACHED RETINA.

ROBERT SCOTT LAMB, M.D.

WASHINGTON, D. C.

This paper presents the reasons for assuming endocrin disturbances as connected with retinal detachment. It gives details of treatment based upon this view and some of its results. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, April 21, 1921.

There is always a beginning to any theory, and as nearly as I can recall, the thoughts regarding the method of procedure to be described were brought about by the consideration of the case of a patient in whom there had been a previous detachment and whose recent detachment was of several months' standing. She was operated on twice by a very skilled ophthalmologist and came under my care with nothing but light perception and that not very certain.

It is almost impossible to describe the flood of thought and the various imaginings that come to one on the first fleeting observation and consideration of a patient, and so it was with this particular patient. My impression, gathered from the observation, was that this person had a physical development in which the dominating endocrin organ was probably pituitary and there seemed a lack of sufficient thyroid to carry on properly the metabolic processes of the body. The woman was beyond the climacteric and had, undoubtedly, during her lifetime hypersecreting thyroid with the flushed face and widely dilated pupils, but she had always been intermittently subject to melancholia and was unquestionably definitely vagotonic.

The treatment to be described later was carried out on this patient for a period of some months until she was able to make out outlines of windows, frames, cross-bars, tables, chairs, mantle and other objects around the room. Then there occurred a violent period of mental depression caused by the return of her daughter and her granddaughter to their homes in a distant part of the country; she wept for the greater part of each twenty-four hours during the succeeding two weeks. After this the failing vision indicated that

any further attempt to restore it was not justified in view of the hardship of certain discomfort attendant upon the administration of a portion of the treatment.

Before describing the treatment or reciting further what has been done in connection with one of my cases, it may be well to consider very briefly a conception of the status praesens of the treatment of detachment of the retina, which presupposes to some extent a knowledge of the possible etiologic factors at the time that this treatment was outlined. The idea seemed to prevail that part of the cause of detachment of the retina was a lowered intraocular tension, fluid vitreous, also myopia in most cases, and a strain or injury by blow upon the eyeball itself. The remedy was either the hoped for spontaneous reattachment after a period of rest in bed with sand bags to the sides of the head and only such motion as was absolutely necessary on the part of the patient, in so far as the head was concerned; or resort to operation by trephining, puncture or, as one ophthalmologist decided, multiple puncture with cautery needle. This is certainly not a very hopeful picture when observed from the viewpoint of the ophthalmologist who is attempting to be of service in curing or alleviating ocular defects or diseases.

It is no wonder, therefore, that certain facts and theories should come to one in the hope of bettering the condition of a patient by methods which might be somewhat milder and might even perhaps more nearly approximate the end result desired, that of restoring vision to a greater or less extent; or if the worst comes to the worst, at least delaying the time when a detachment becomes complete and the eye blind.

My conception was that three things had to be done. One was changing the character of the fluid coming thru the eye in view of the amount of detritus and of viscosity of the fluid. The second was the removal, if possible, of the fluid lying behind the detachment. The third was the increase of the intraocular tension in order that the retina might be held in place, if once restored approximately to its former position.

To accomplish the first of these, Murphy drip, containing 10 grams of sodium carbonat and 20 grams of sodium chlorid to the liter of water was used at first daily and then every other day. To accomplish the second, cyanid of mercury, one to three thousand solution fifteen drops combined with three drops of 1% solution of acoin, was used once a week or ten days depending upon the amount of reaction which had taken place at the time of the injection. This was made deeply thru the conjunctiva into the tissue overlying that portion of the eyeball where the retina was detached. The third, was covered by the use of thyroid increased in dosage from one-half grain, three times a day, to a point where symptoms of oversecretion of the thyroid appeared. In addition to this, fibrolysin was given for the purpose of increasing the white blood corpuscles, thereby accelerating the natural processes of repair.

A report of one case somewhat in detail may be of interest, and illustrate the method sufficiently to form a basis for comment and criticism of the method used. On December 22, 1910, there came from Bloomsburg, Pennsylvania, a teacher of manual training, 34 years old, who had worn glasses for 24 years. In June the right eye became quite annoying on account of floaters. The patient was treated by Dr. Taylor in Wilkesbarre. Previous lenses indicated right eye minus 6.25, left eye minus 17. The right eye was more deeply set than the left and somewhat painful. There were vitreous opacities and cataract beginning at the posterior pole, and the pupil did not contract to light. The ophthalmoscope

showed a detached retina of the umbrella type, more marked on the temporal side and including the macula. There was only one point of attachment visible. There were a few vitreous opacities in the left eye, the eye being otherwise relatively normal for a highly myopic eye; and with a minus 14 1/2 combined with a minus 1 1/2, cylinder axis 75 degrees, six-fourths vision was obtained. This glass was given him in Hallauer 67 and another Hallauer 64 contained a minus 12 1/2 combined with the cylinder for near work. He was cautioned to change his occupation and go out into the country and raise bees, chickens, flowers or do something which would not require any manual labor. He was seen again in June 1912; but not after that until brought to the office on April 11, 1920, with light perception only in the left eye. Ophthalmoscopic examination together with his previous history suggested the probability of detachment of the retina of the left eye, which extended so high that he could not see the thing he looked at. There was light perception above, especially toward the temporal side and very bad and very extensive detachment. On the 14th, he went to the hospital, at which time the detachment covered the area overlying the temporal side, nasal and below. The disc could not be seen and the vitreous was very hazy so that no details of the fundus could be made out.

The patient was put to bed in a recumbent position and cautioned to be relatively quiet. There was ordered for him a Murphy drip of sodium carbonat and sodium chlorid, one liter once a day. Internally he was given half a grain of thyroid three times a day and hexamethylenamin and aspirin, 5 grains each every four hours. Locally, there was administered every three hours one drop of the solution pilocarpin, grains 1/2, and dionin, grains 10, to a half ounce of water, to be followed for five minutes by hot applications. After keeping the patient on this treatment for a few days, the vitreous began to clear and some few vessels could be seen above the disc,

but the disc could not be seen on account of the detachment being so high as to interfere. He was then given an injection of cyanid of mercury, 1 to 3,000 solution, and this was repeated in different locations overlying the area where the detachment had occurred. In all four injections were given, when it became apparent that the retina was protruding less far into the vitreous chamber, and the disc began to be visible.

His vision on the 21st of April was sufficiently improved to enable him to see things straight ahead. At the end of two weeks he was allowed to sit up in bed. At the end of three weeks he was able to sit up out of bed. Meanwhile, the Murphy drip had been given about every other or every third day.

By the last of May he was not only reading headlines in the newspapers but was able to sit out of bed and read. He was, however, kept under observation in the hospital for caution's sake until about the middle of July, after which he had no particular care except the use of the pilocarpin and dionin solution at home until October 22, when I visited his house. The ophthalmoscopic examination then showed with a minus 16 diopter lens a very clear area surrounding the macula and disc. Far forward in the lower nasal and temporal areas the detachment was still visible. There was a slight vitreous haze. The vision was quite good with the glass which had been given him some ten years previously. He was again seen on November 13 and a few words of caution given him about moving around. He continued the use of the pilocarpin and dionin.

On January 6, 1921, examination indicated that some change had taken place in the eye ground; there was slight edema of the retina above, marked vitreous haze, no further detachment, however, definable. He was advised to go to the hospital where he remained until the 14th of February. For the first few days only, he was required to lie quietly flat on his back and to have the Murphy drip. At the

end of two weeks, he was allowed to sit up in bed.

Since February 15, 1921, he has been at home, using the thyroid and his eye-drops of pilocarpin and dionin. His vision remains quite good and the fundus very satisfactory.

Another case of much interest is one in which the detachment occurred in the right eye of a physician, a very busy man, who felt that he could not afford to lie in bed. This case has been conducted from the first as an ambulatory case and tho the vitreous is hazy the patient is able to maintain his field of vision and see objects without any particular difficulty, in fact, the field of vision is larger. I must say that he has neglected to take the treatment regularly at the office, and I have hopes that with regularity I should be able to do even more for him than has already been done.

A few running comments might not be amiss in trying to illustrate the conduct of the case above described. In the first place, it hardly seems a case of spontaneous reattachment in view of the amount of degenerative change present as evinced by the large area of detachment and the marked vitreous haze, together with the fact that he did not remain in bed for anything like the usual time that most cases of so-called spontaneous reattachment have been known to remain in bed. There was no operative procedure directed towards the evacuation of subretinal fluid but there was, possibly thru irritation, possibly thru the phagocytic action of the greatly multiplied leucocytes brought to the neighborhood of the detached area by the injection of the cyanid of mercury, an absorption of the subretinal fluid at least in part. The Murphy drip in my previous experience and in this case was undoubtedly responsible for the clearing of much of the detritus from the vitreous.

Asking the question, "Does the thyroid substance really increase the flow from the ciliary processes?" the answer is, "I don't know." I do know, however, that it does increase metabolism very considerably, which may

account for the betterment in the condition of the eye. But there is reason for presuming that it actually increases the flow. It increases the flow of tears; it increases the flow of saliva, especially in vagotonic individuals and it increases the flow from other glands of ectodermic origin. It seemed, therefore, more than likely that it might induce an increased flow from the secreting glands of the ciliary processes, and it was this bit of logic that led me to use it to increase the intraocular tension and thereby to hold in place against the subretinal and choroidal structures the retina, which, I expected, would be induced to assume its approximate former position by the withdrawal of the fluid behind it and be re-adjusted during its reattachment.

If these two processes could be made simultaneous, there was no reason, it seemed to me, why retinal detachment could not be treated without recourse to surgical procedures which have, in spite of Deutschmann's claims, never been universally successful. It seemed to me always that the lack of success has been due to the fact that the remedy was inadequate being to a certain extent, analogous to the replacement of paper upon a wall by means of tacks when the paste had become dried out. It could never be the same; it could

never look the same and certainly could never function the same as if no mechanical injury had been done the retinal elements.

The advantages of such a method as described are immediately apparent; freedom from danger of infection; freedom from hemorrhage and other accidents incident to the mechanical entrance into the subretinal space and vitreous. The advantage, especially in a nervous patient, of being able to be up and about in a limited period of time following the inauguration of the treatment, is in itself sufficient to warrant the trying out of the method. The restoration of vision without scotomata of greater or lesser size, due to the mechanical injury incident to surgical procedures, is worth having. As to prognosis, one may say, as was once said by Sattler, the more recent and less extensive the detachment the more hopeful the outcome. In making the prognosis, one must, of course, keep in mind the relative normalcy of the good eye.

In conclusion, may I say that I believe there are some new view points here presented upon the subject of the treatment of retinal detachment and I hope a full discussion will support me in thinking this method of treatment useful.

NOTES, CASES AND INSTRUMENTS

GRAPHIC METHOD OF RECORDING TYPES OF EXCAVATION OF THE OPTIC NERVE HEAD.

HARRY GRADLE, M.D.

CHICAGO.

In the daily routine of office or clinic work, too little attention is paid to recording abnormalities of the normal fundus, principally because of the amount of time necessary for such a record. One of the highly important

conditions of the normal fundus, and one which frequently is of great value in the differential diagnosis of diseased conditions found upon subsequent examination, is the type of physiologic excavation of the disc. Only too frequently is the notation of "large physiologic excavation" made upon the record, with no further annotation regarding the shape, size, or depth. The following classification is offered in the hope that the free use of the graphic method of annotation will lead to more extensive permanent records.



DEPTH OF EXCAVATION.

- I. Shallow excavation, scarcely dipping below the plane of the surrounding retina.



- II. Slightly deeper excavation, but still not so deep that the tips of the Lamina Cribrosa are visible.



- III. Deep excavation with the tips of the Lamina Cribrosa visible.



CHARACTER OF EXCAVATION.

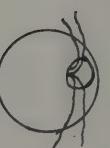
- A. Centrally located excavation with sloping sides, involving not more than one third of the entire area of the disc.



- B. Centrally located excavation with sloping sides, involving more than one-third of the entire area of the disc.



- C. Excentrically located excavation with sloping sides.



- D. Excentrically located excavation with a portion of the periphery with sloping sides and the remainder of the overhanging type.



- E. Centrally located excavation with a portion of the periphery with sloping sides and the remainder of the overhanging type.

LOCATION OF EXCAVATION.

The point at which the excavation most nearly approaches the margin of the disc is to be recorded in terms of axes (American Astigmatic Axis Notation). Examples of records employing this method of notation would be as follows:

METHODS OF USE.

Ex. II-B would indicate a moderately deep centrally located excavation with sloping sides but not overhanging, occupying more than one-third of the area of the entire disc.

Ex. III-D-30 would indicate a deep excavation with the tips of the Lamina Cribrosa visible, an excavation with one side overhanging and the remainder sloping, located eccentrically and approaching the disc most nearly at axis 30. (In the left eye, for example, this would mean 30 degrees above the external horizontal meridian).

VOLUNTARY UNILATERAL NYSTAGMUS.

JAMES MOORES BALL, M.D.
ST. LOUIS, MO.

The following brief account of a rare condition is submitted for publication for the purpose of securing priority. So far as the writer knows, only one like case (that of Pyle) has been recorded.

J. L., male, aged 21 years, consulted me on March 15, 1921, complaining of headache over the left eye—a symptom which had been present for six months. He also is troubled with after images.

The globes, adnexae, and pupillary reactions are normal. Stevenson's muscle test shows insufficiency of convergence varying from 1° to 14° . Kagenaar's ophthalmometer shows astigmatism with the rule: 0.75 D. in the right eye; 1 D. in the left. Vision in the right eye = 20/20; in left eye, 20/20. At this point in the examination the patient mentioned his ability to produce nystagmus at will, and at once gave a demonstration, as follows:—

Seated at one meter, fixing with his right eye, Mr. L., at will, could move

his left eye inward and outward for about 2 millimetres from the vertical line. Meanwhile the right eye remained immobile.

Under cycloplegia (atropin) vision was: R. E.=20/50; L. E.=20/40.

R. E. with +.50 + .50 axis 90°=20/13.

L. E. with +.75 axis 90°=20/13.

A Wassermann test was negative.

The writer expects to make a full report of this case at a later date.

Pyle: Jour. Am. Med. Assn., Dec. 5, 1908.

DIPLOPIA WITH LENS OPACITY

EDWARD JACKSON, M.D.

DENVER, COLO.

Mr. F., aged 59, lost useful sight of the right eye from being struck by an automobile, 8 years ago. The loss was noticed when he regained consciousness 26 days after the injury. The upper two-thirds of the optic disc is atrophic; but some vision remains in the nasal periphery of the field.

The left eye has corrected vision of 1.1 and a full field; but it has been

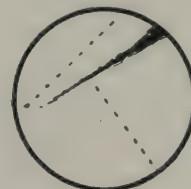


Fig. 1.—Diagram of pupil showing spicule of opacity of lens, and dotted lines to indicate axes of convex correcting cylinders in parts of the pupil above and below the opacities.

failing in the last year. The chief complaint is of diplopia, a bright image seen above, and a fainter image below to the left. These images have slowly become more widely separated. The ophthalmoscope shows a single definite spicule of lens opacity situated in the anterior cortex, extending from "two o'clock" toward "nine o'clock," as shown in Fig. 1. Otherwise the media are clear. In both eyes the vessels are irregularly constricted and the veins "kinked" where they cross the arteries.

Skiascopy shows entirely different refraction in the areas above and below

the spicule of opacity. Both are hyperopic; but the upper one seems to need a plus cyl. ax. 30°, and is irregular. The lower one is more regular and seems to require a plus O. 75 cyl. ax. 130°, which gives the eye its best distant vision. The separation of the images is about as great as would be produced by a 4° prism.

On bringing a card before the eye so that it covered the upper area, the lower and fainter image disappeared. On bringing the card from below so that it covered the lower area of the pupil, the upper and brighter image disappeared. The ophthalmometer showed no corresponding defect or flattening of the cornea.

It was concluded that the diplopia was due to a slight relative flattening of the anterior surface of the crystalline lens, along the line of the spicule of opacity; that this flattening had been increasing. That this indicated a condition of shrinking rather than swelling in the region of the opacity. And that this shrinking in conjunction with the definite boundaries of the opacity and absence of haze in other parts of the lens, indicated that the lens opacity was likely not to increase.

CIRCUMSCRIBED ECTASIA OF THE CORNEA.

G. N. BRAZEAU, M.D., F.A.C.S.

MILWAUKEE, WIS.

It is not unusual for thinning of the cornea, from either traumatic or infectious inflammatory causes, to end in a keratocele, but in cases such as this one the cause remains unknown. In this latter variety, the ectasia is more or less symmetrically developed in both eyes, tho its bilaterality could not be determined here as the right eye had been removed many years ago.

Circumscribed ectasia is an appanage of old age, rarely occurring before 60 years; this patient was 72 years. It is of very slow development, transparent, and usually accompanied by very high astigmatism, 7 to 13 diopters with myopia, which accounts for the poor vision following it.

This patient has always done very fine needlework with the aid of a minus 4 diopter lens. She consulted me because her vision was reduced to counting fingers at three feet. Besides noting the ectasia, I found an almost complete opacification of the lens, the anterior chamber very deep, the iris funnel shaped, the tension and the light perception normal. The ectasia occupies the upper margin of the cornea for about 3 mm. and is opaque, the rest of the cornea is clear. The opacity is concentric with the limbus, from which it is separated by a narrow strip of transparent cornea.

Fuchs believes that ectasia is a degenerative process intimately related to an exaggerated development of the arcus senilis; while Terrien believes in the theory of dystrophy; and Lauber thinks it due to an inflammatory cause.

I advised removing the lens, since her previous vision had been so good. The poor vision that usually accompanies ectasia of the cornea, constituting its principal symptom, tho present now, is not due to any corneal irregularity but rather to the defective condition of the lens. Had the poor vision existing been due to any great amount of astigmatism the removal of the lens would again complicate the situation by adding to the already existing astigmatism, that, incident to a corneal section.

The usual treatment of ectasia of the cornea consists in correcting all the errors of refraction as well as possible. At best, the vision remains low.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Annual Congress was held in London, May 5th, 6th and 7th, 1921. Mr. J. Herbert Fisher, F.R.C.S., President.

The arrangements included the reading and discussion of papers, holding set debates, the delivery of the Bowman Lecture, by Mr. Treacher Collins, a clinical meeting at St Thomas' Hospital, a museum of exhibits and instruments and apparatus, and a dinner. It was a marked success, the attendances being well maintained at all the meetings.

The Personal Equation

THE PRESIDENT, in the course of his opening address, after expressing his appreciation of the high honor conferred on him by his election to the chair, said the complete ophthalmologist did not, indeed, could not exist. If perfection were attained, then there would be nothing more for which to strive, no further incentive to effort. The subject was as wide as the heavens, as deep as the ocean. To comprehend ophthalmic science as it now exists its devotees must perforce enlist as allies the mathematician, the physicist, the chemist, the physiologist, the anatomist, the physician, the surgeon, the urologist, the radiologist, the pathologist, the bacteriologist. Within the ambit of ophthalmology there was room for every man to exploit to the full the gifts and inclinations with which he had been endowed.

Perimetry and the examination of the central field for color defects, absolute and relative scotomata, were playing a larger part in eye investigations, and it behooved them to remember the personal equation when employing these methods, if right value was to be attached to their results. One investigator's charts would rarely be found to coincide with those of an-

other on the same subject being examined. Only when a surgeon had stereotyped his own personal equation and controlled that of his patient, would his results on the same case on successive dates be reliable for clinical purposes.

Tonometry was tending to replace digital estimation of intraocular pressure, and it was for the younger ophthalmologists to explore its value. Not yet, however, would it supplant the older method. Every means should be taken to keep clear of error. The indication for or against operation in a case of chronic glaucoma would never be determined by such variables as the readings on a tonometer, or the shape or fluctuations of the blind spot, tho these observations should be a useful supplement to the well-trained clinician.

In ophthalmology, the symptoms narrated by the patient were ambiguous, the chief signs were precise. Too often the ophthalmologist was confronted with the highly myopic sempstress or clerk, incapacitated in the later years of working life by failing vision. A little guidance given to the progressive myope about to embark on the serious business of life—a suggestion as to suitable employment—might save such a one from a life of misery, ending in shipwreck. Compared with such help, the most perfect retinoscopy was of little value. In no other organ of the body, than the eye, was it given to the clinician to view the pathologic process in actual progress, and the ophthalmologist was proud to be called in by his colleagues to clinch, by his objective methods, the suspicions of grave local or general disorder. He could give much help to the neurologist in cases of hemianopia by the presence or absence of Wernicke's sign or pupillary reaction.

The President proceeded to advocate a closer working cooperation

with colleagues in general medicine and surgery; the gain would be mutual. But the ophthalmologist must keep his own house in order. The pupil must be taught to realize that in dealing with his patients he had responsibilities which he could transfer to no one else. Laboratory investigations might supplement his own work, but they were no substitute for it, and he must be trained to stand erect by himself. The study of disease in the eye could be undertaken only by those who had been trained in every branch of medicine and surgery; on this there could be no compromise. Ametropia and its results could not be surrendered to the optician. Physiologic working, not visual acuity, was the goal of the refractivist. 6/6 vision was not proof that the most serious—or indeed any—disease of the eye was not present. Mr. Fisher concluded with a sympathetic appreciation of the work of two recently deceased members of the Society, Mr. Charles Higgens, and Mr. H. E. Juler.

On the motion of Sir Anderson Critchett, the President was cordially thanked for his address.

Cyclitis with Parotid Swelling.

MR. MAITLAND RAMSAY, Glasgow, read a paper on a case of cyclitis associated with swelling of the parotid glands, and paralysis of cranial nerves. The patient, an unmarried lady of 31, had had enlarged cervical glands removed at 6 years of age. After family trouble and hard work she awoke one morning with her lower eyelids puffy and her ankles swollen. No abnormality was discovered in the urinary, circulatory, respiratory or digestive systems. Swelling increased, and extended to her knees, and the skin of the chest was hyperesthetic, accompanied with intercostal pain. After ten days in bed the edema of the ankles disappeared, but not the intercostal pain. Even large doses of aspirin only gave temporary relief.

In the third week the left parotid gland began to enlarge, and the right a week later. A fortnight later the sight of the right eye became dim, and

a similar condition came on in its fellow five days later; the eyes readily watered on exposure to light. The sight became very dim, and there was pericorneal injection with numerous spots on the posterior surface of the cornea, discoloration of the iris, irregularity of pupil, and a deep anterior chamber, but the intraocular tension was not increased. The visual acuity was R. 6/12, L. 6/18.

A week or two later there was sudden paralysis of the left facial nerve. Failure of vision was now rapid, and in a few days she could scarcely distinguish a hand held between her eyes, and she had a throat condition which interfered with swallowing; the soft palate was seen to be paralyzed. At this stage improvement set in, coincidently with the administration of thyroid extract, on the assumption that the condition was a deficiency disease. She got well. Neither mumps or diphtheria could be considered as causal factors.

Pupillary Membrane and Lamellar Cataract.

MR. J. GRAY CLEGG, Manchester, read a paper on partial monocular lamellar cataract associated with persistent pupillary membrane and birth injury. Dr. Gordon Renwick cooperated with him. He showed and demonstrated the slides by the epidiascope, and raised the question whether the birth injury had anything to do with the association of partial lamellar cataract with persistent pupillary membrane. He referred to Treacher Collins' work on the subject.

Age Changes in the Refraction of Crystalline Lens.

MR. G. F. ALEXANDER read a paper on the influence of age on the power of the crystalline lens. He said the prevailing teaching inferred that in the lens there were surfaces acting as concave refracting surfaces, and that the increase in the index of the cortex was, by increasing their power, the cause of the diminution of the power of the lens as age advanced. The author, however, contended that there are no such surfaces in the lens. In regard

to refraction, a spherical surface separating two media of different index was convex if its centre is on the side of the one of greater index, and concave if it is on the side of the one with less index. And as in the lens and its nucleus the more central the lamellae were the higher were their indices, the center of their curvature must lie on the side of the medium of greater index. Hence the surface separating the cortex and nucleus is a convex and not a concave one; and a ray incident on either surface of the lens encounters in its transit thru it a series of convex refracting surfaces, and at no part of its surface a concave one. He contended, secondly, that the cause of the diminution of the power of the lens as age advances is the diminution in the convexity of its surfaces and those of the nucleus from their growth. He showed that the radius of the surface of the lens is greater than that of the surface of the nucleus. The only factor tending to diminish the power of the lens as age advances is the increase in the radii of its surface and those of the nucleus accompanying their growth.

Torsion in Near Seeing.

MR. ALEXANDER read a paper also on the estimation of torsion for near vision.

A Court Quack.

MR. R. RUTSON JAMES read a paper entitled, "Sir William Read, Oculist to Queen Anne and to George I. Quack, Mountebank." It was an exposure of extravagant claims to medical and surgical skill on the slenderest foundation, and a narration of the material success achieved.

Tumors of the Choroid.

MR. D. J. WOOD, Cape Town, sent two papers, which were read. The first was entitled "Two Cases of Flat Neoplasm of the Choroid." The first of the patients, a man aged 27, complained that during the last six weeks he had lost the sight of his left eye. There was a widely dilated pupil, unusual redness of the outer part of the

sclerotic, and a detachment of retina close to the back of the lens. A colleague had discovered disease in the left antrum and in the back part of the lower jaw. Glands on the right side of the neck were enlarged. A portion of one which was taken away was supposed to be epitheliomatous. X-rays produced improvement. It was evident, however, that there was an intraocular tumor, as the iris began to bulge forward on the outer side. The eye was therefore excised from the optic nerve forward to the iris, with complete detachment of retina. The growth was everywhere in contact with the sclerotic, and infiltrated it; and it extended up to, without involving, the optic nerve.

The second patient was a Jew, aged 40, whose left eye was glaucomatous. The eye was blind, the cornea steamy, the pupil dilated, and there was an area of redness on the outer part of the sclerotic. The eye was excised. The tumor occupied the whole of the lower half of the fundus, and was a flat growth with a complete retinal detachment. It had begun close to the optic nerve, and extended forward to about the ora serrata. It was spindle-celled. Mr. Treacher Collins had examined the specimen, and considered it was of the epithelial type, the cells being arranged in alveolar fashion; he thought it was probably a secondary carcinoma of the choroid. A section from the glands in the neck showed an epitheliomatous growth.

Extension of Conjunctiva upon Cornea.

Mr. Wood also sent a paper on a case of symmetric encroachment of the conjunctivæ on the corneal margins. The patient, a somewhat old man, had been treated for cellulitis at the root of the nose, and pus was evacuated from the lids of the eye. The corneal margin was found to be covered by a ring of conjunctiva from 2 to $2\frac{1}{2}$ mm. wide, and the conjunctival vessels were continued into it. With a fine probe the conjunctiva could be separated from the cornea.

The Psychology of Vision in Health and Disease.

PROF. C. SPEARMAN, Ph.D., introduced the debate. He said we see objects in different places, and the question of the source of this power was one of the most difficult in psychology. Generally, the authorities had been divided into two antagonistic camps. The first consisted of the empiricists, who regarded visual place as the outcome of experience, arising thru some such process as "association" or "fusion." On the other side were the "nativists," for the most part physiologists such as Galen and Johannes Müller, who maintained that the power was essentially innate. According to them, the apparent situation of any particle was "specific energy" of the particular nerve fiber stimulated. This camp had also brought forward a strong array of evidence, and claimed that pathologic cases favored their view.

There was no longer reasonable doubt that our spatial perception was, at any rate partly, determined by factors of hereditary character. If the origin was to be sought in experience, it must be in some degree that of our ancestors. Wheatstone made a serious breach in the extreme nativist theory when he showed that the pair of images thrown on the two retinas by any visible particle did not, in general, fall on "corresponding" points. It was, in fact, their very deviation from "correspondence" that furnished our chief criterion of distance and depth. A pair of images, he showed, tho thus falling on noncorresponding points, could, nevertheless, be seen as a single image.

Straub concluded that the binocular perception of distance must be merely derivative from the far older unioocular perception of it. Professor Spearman showed that two retinal points, altho truly "corresponding" and normally producing the same visual situation, engendered, under certain circumstances, different visual situations. In fact the spectacle might be presented of an object moving backwards and

forwards altho, all the time, the place of retinal stimulation remained unchanged. He leaned still more to the empiricist school than to the nativist.
Evolution of Visual Perceptions.

MR. J. H. PARSONS, F.R.S., read an exhaustive paper on the evolution of visual perceptions, with special reference to the role of suppression. It is difficult to give an adequate idea of the contribution in a short precis.

Sir Robert Armstrong-Jones, the psychologist, spoke of an acute melancholic being restored to mental health by having her refractive error relieved by glasses. He referred also to the relief produced on mental patients by appropriate color schemes.

Visual Auras in Epilepsy.

DR. S. A. KINNIER WILSON read a paper on psychologic peculiarities in certain visual auras in epilepsy. He related cases of idiopathic epilepsy which were distinguished by a mental state presenting curious psychologic characteristics of its own. He recalled that Dr. Hughlings Jackson had directed attention to this condition, and used several terms to describe the occurrences, one of which was a "voluminous mental state." Dr. Wilson said there were two distinct types which would interest the ophthalmologist. The first was the "deja vu," or the "familiarity" type and its converse the strangeness type (in which surroundings and conditions either seemed very familiar or unaccountably strange); and the second was the "visual memory" type. He gave examples of both from his own experience.

DR. A. S. PERCIVAL said a sensory impulse may not affect consciousness, and yet a coordinated movement in response to that stimulus may result. The psychology of vision really meant, he said, an inquiry as to how a physical or chemical change in certain nerve cells could give rise to a consciousness or sensation of light.

Amblyopia from Disuse.

MR. FRANK JULER read a paper entitled, "Amblyopia from Disuse: Visual Acuity after Traumatic Cataract in Children." He said he had thought

that more light might be thrown on this subject by evidence which gave more exact definition or determination of dates of onset than was obtained from ordinary strabismus cases. He thought that in certain cases of injury to the lens in young children a line of evidence might be obtained which would satisfy the disputators; and perhaps decide whether amblyopia from disuse exists or not. In most cases of traumatic cataract, he said, the opacity was rapid, and little light reached the retina after the injury. In some of his cases the lens matter had been evacuated soon afterwards, leaving only an opaque membrane, while in a few an artificial pupil had been made not much later.

Even in cases where an artificial pupil had been made, the deviation of images by the aphakic hypermetropia must be so great that the retinal impulses could not compete with or assist those transmitted from the retina of the sound eye, and one would expect these impulses to be neglected, with the consequent development of amblyopia from disuse, if such disease exists. The latter should still more certainly develop if an opaque lens or membrane blocked the light path for some considerable period.

He had been able to trace a certain number of the juvenile traumatic cataracts recorded in the Moorfields Hospital notes from 1910-17, to see them personally, in many cases to form a new pupil, and finally himself examine the vision, fundus, and other points in every case quoted. He found a striking line of difference between the final visual results, depending on the age at which the lens became opaque. None of the eyes which became cataractic before the age of 5 had retained a final central acuity of vision of 6/60. The series gave evidence that there is such a disease as amblyopia from disuse; that it affected the eyes of children up to 6 years, that it did not attack the eyes after the age of 7 years, that it was not merely a standing still of the development of the retina or of certain cerebral associations, but that it caused a real retrogression of the effective power of the

retinal impulse on the consciousness after the macula had reached an age at which a central vision of 6/6 was normally present. The existence of amblyopia from disuse as the result of concomitant squint had been the subject of dispute among ophthalmologists for the last fifty years.

Changes in Visual Organs with Erect Posture.

MR. E. TREACHER COLLINS then delivered the Bowman Lecture, taking as his subject, "Changes in the Visual Organs Correlated with the Adoption of Arboreal Life and the Assumption of the Erect Posture." He was cordially thanked for the Lecture.

Treatment of Manifest Strabismus.

MR. CLAUD WORTH, in opening the debate, said the matters to be considered in the treatment of convergent squint were: (1) the prevention or cure of amblyopia *ex anopsia*; (2) the correction of the refractive error; (3) fusion training, and (4) operation. If a constant unilateral squint had lasted a considerable proportion of the child's life, in the absence of efficient treatment the deviating eye would be found to be more or less blind. Probably no one now doubted that the amblyopia was almost invariably acquired from disuse, and the loss of sight was more rapid the younger the child. One who began to squint constantly at the age of one year might lose central fixation in three to four months. The child must be forced to use the deviating eye; that was far more important than all the rest of the treatment of squint.

In a recent squint, to cure low degrees of amblyopia, or prevent it, the fixing eye should be kept under atropin until it became the deviating eye. The child should then be seen again after the effect of the atropin had passed off. After this, the deviation must be kept alternating, one or other eye being atropinised occasionally if necessary. If central fixation in the deviating eye was absent or unsteady, the atropin treatment was not sufficient. Then the fixing eye should be continuously occluded; intermittent bandaging was of little use.

With regard to correction of refractive error, no child was too young to wear glasses if they were required. As to fusion training, there were certain principles which must apply to all methods. The child must be young, preferably under 6 years of age, and the sight of the deviating eye must be good. A device should be used for throwing pictures simultaneously upon the macular region of each eye. The most difficult step was to overcome the suppression. A good way was by unequal illumination of the object slides in whatever instrument was being used, and the interest of the patient must be maintained during each lesson. The object of fusion training was not to correct the deviation, except in small degrees, but to enable the patient to see binocularly when the visual axes shall have been restored to approximately their normal relative directions.

With regard to operation, if measurements showed that the angle of deviation was increasing or was not decreasing operation became necessary. If there was no hope of binocular vision, he did not, usually, operate until the 7th or 8th year of age. Formerly, he frequently performed tenotomy of the internal rectus in combination with advancement of the externus in high degrees of convergent squint, but this practice was finally abandoned by him in 1905. Many of these cases had been followed by divergence long afterwards.

For many years he had been relying on advancement alone, and, except in very small deviations, both externi were advanced. He proceeded to enter into the minutiae of technic, concluding with the remark that there were practically unavoidable failures in squint operations; the result attained was a measure of skill and experience of the surgeon, who should be prepared to accept the responsibility for it.

Concomitant Convergent Squint.

MR. A. J. BALLANTYNE made a contribution in which he dealt with his own experience of concomitant con-

vergent squint. In every case the first procedure should be an estimation of the refraction and the prescription of suitable glasses for constant wear. If there was merely a low degree of hypermetropic astigmatism, one would not expect glasses to influence the squint, and the wearing of glasses would be postponed until two years of age. In many the wearing of glasses, with training if necessary, was all that was needed. Practically all his cases were aged 7 years or under, the largest squint he had corrected was 40°, the patient being 18 months old, and the squint of two weeks' duration; in most of the cases the angle was 15° or less. If one eye was amblyopic, an attempt should be made to train it. In most cases, he thought, the amblyopia was the result of the squint. He applied atropin more or less continuously to the sound eye. He was inclined now to operate at an earlier age than formerly was thought desirable. Advance alone sufficed in many cases; he had never seen permanent over correction result from advancement or muscle folding, therefore he would not hesitate to operate at any age. Worth's operation could be depended on to correct 20° or 25° of convergence. The muscle folding operation gave about half this effect. He rarely did tenotomy of the internal rectus, and he objected to combining tenotomy with advancement at one operation in a patient under 16 years. If tenotomy were done in children, it should be in the nature of a last resort. Strabismus operations might be very disappointing in excitable and nervous children. Failure in operation was in some cases due not to slipping of the stitches, but to looking to a remedy of a mechanical kind for an error which was functional. His results from amblyoscopic fusion training had been disappointing. The varied pathogenesis of concomitant strabismus made it evident that the same treatment would not be suitable in every case.

DISCUSSION. Mr. M. S. Mayou said that if a patient had good vision in both eyes and there was some attempt at fusion, he operated as early as possible,

SOCIETY PROCEEDINGS

provided the patient had worn glasses a year without improvement. For convergent strabismus up to 15° he did tenotomy of the internal rectus, but in young children as much as 20° could sometimes be corrected by it. For convergent squints of 15° to 45° he did a tenectomy associated with tenotomy; he preferred a shortening of the tendon and using the stump of the muscle attached to the globe for holding the sutures.

Mr. N. Bishop Harmon said the factors responsible for squint could be grouped under three heads: (1) defects of the eyes; (2) defects of the muscles; (3) toxic influences, in the widest meaning of that term. Among 368 infants in a higher grade school, only 8 had emmetropic eyes, 6 had errors or refraction, mainly hypermetropia, and in 126 the errors were of considerable or even high degree. Yet among all those children there were only 8 squinters. The most influential factor in squint he considered to be defective balance of the muscles. His favorite method of operating was shortening of one muscle by subconjunctival reefing with lengthening of the antagonist by tenoplasty.

At the evening meeting the following papers were read:

Lieut-Col. H. Herbert: A Justification of the Wide Iris Prolapse Operation for Glaucoma.

Mr. T. Harrison Butler: On the Rational Treatment of Glaucoma.

Mr. C. Goulden and Mr. M. H. Whiting: Implantation Cyst of the Sclera following an Operation for Squint.

Sir William Lister: (a) Some Intraocular Epithelial Cysts; (b) Punctate Deposits in the Retina.

Mr. P. G. Doyne: Some Observations with the Scotometer.

On Saturday morning there were further papers, as follows:

Sir Arnold Lawson: A Case of Orbital Tumor (Neuroma).

Mr. Harold Grimsdale: A Note on the Mechanism of the Equilibrium of the Globe.

Mr. E. H. Stack and Dr. George Mackay exhibited motor trephines, and Mr. A. W. Ormond read a paper on Extraction of Cataract by Suction.

H. DICKINSON.

COLORADO OPHTHALMOLOGICAL SOCIETY.

April 16, 1921.

EDWARD JACKSON, presiding.

Orbital Tumor.

MELVILLE BLACK, Denver, presented a man aged 47 years who had come complaining of epiphora and double vision. The latter, which had first been noticed in January, was vertical and crossed, and was increasing. Downward and inward from the left eye, and a little to the temporal side of the internal canthus, was a hard round lump, which from its contour and solidity Dr. Black suspected to be a cyst.

DISCUSSION. C. E. Walker, Denver, had seen a case of tumor which started in about the same region and proved to be a sarcoma extending a good way back into the orbit. The tumor recurred, but the patient refused to have the eye removed and died some time later of sarcoma of the brain.

W. C. Bane, Denver, thought the growth a cyst connected in some way with the ethmoid sinus. The patient said that after manipulating the swelling it seemed to get larger and more prominent. Dr. Bane had operated some years ago on a child with a similar tumor which communicated with the nose.

H. R. Stilwill, Denver, had seen Dr. Black's patient about a year ago, when there was a moderate swelling at the inner canthus. The patient at that time complained of tearing, and now said that Dr. Stilwill had used a probe and had syringed thru the lacrimal passages, finding them patent.

J. J. Pattee, Pueblo, had removed a lipoma five years previously from a woman 35 years old. It was located just above the lower lid near the internal canthus, was quite solid, and remained intact during the excision.

In the course of several years there was no recurrence.

Edward Jackson, Denver, favored operation thru the conjunctiva. The location seemed an unlikely one for a dermoid cyst, but one must be ready to meet the difficult situation associated with such a cyst; and the presence of such a cyst or of a connection with the ethmoid seemed not improbable. The growth felt too smooth and regular for a sarcoma.

Brain Tumor.

F. E. WALLACE, Pueblo, reported a case of brain tumor in a woman aged 56 years, with an unusual symptom complex. Seen in July, 1919, she gave a history of dizziness and ataxia first noticed in the spring of 1917. Shortly after the first appearance of dizziness, she noticed difficulty in walking and later in standing erect. There had never been any nausea or failure of vision. The tendency was always to fall toward the right. Beginning early in 1918, there had been progressive deafness in the right ear, associated with pain. At the time of the examination the deafness of the right ear was complete, the hearing of the left ear normal. The pain in the back of the ear was continuous, and was so much worse on lying down that the patient had not gone to bed for a number of weeks. There was no appreciable history of headache. The patient thought that the symptoms had progressed much more rapidly since an attack of influenza late in 1918. For the past six weeks she had noticed a slight weakness in the lips, so that when she drank the fluid ran out of the right side of the mouth. The corrected vision was 20/30 in each eye. The eye-grounds were negative, there being no swelling of the discs or undue tortuosity of the vessels. The complete loss of hearing on the right side was of the nerve type. The neurologic examination pointed to a new growth, probably gliomatous, of the right auditory nerve close to the posterior border of the pons; and Dr. Philip Work advised that the case was inoperable. The patient was operated upon at St. Louis

in December, 1920, and died on the operating table. Relatives stated that a tumor the size of a hen's egg was removed, and that before operation the patient was nearly blind and deaf, and extremely dizzy.

DISCUSSION. J. J. Pattee, Pueblo. The neurologic report referred to a lateral nystagmus. It is rare to get better than 20/30 vision with nystagmus.

G. F. Libby, Denver. Two years ago I saw a child of six years in whom I got vision of 5/6 in the presence of a nystagmus, which was continuous but very moderate in degree.

Dr. Wallace. My patient's nystagmus was not constant but was present only when she looked to the left.

A. C. Magruder, Colorado Springs. It would be interesting to discover whether the surgeon who saw her in the later stages of the disease noted the presence of choked disc.

J. A. McCaw, Denver, referred to a case which he had seen a year or so back in which there had been no choked disc, but a neurologist had found choking of the disc two weeks later.

Special Observations in Refraction.

G. F. LIBBY, Denver, gave a short talk dealing with a number of observations of practical interest as regards the treatment of exceptional refractive conditions. In *amblyopia*, while the poor vision made the selection of a lens difficult for the patient, yet accurate skiascopy, with persistence by the examiner in the details of the subjective test, would often be rewarded by an improvement of from twenty-five to fifty per cent under the use of the correcting lens. In *anisometropia*, altho it was commonly thought that not over 1.50 or 2 D. of anisometropia could be harmonized, Dr. Libby had at times been able to correct a difference of 6.00 D. or more with comfort to the patient. An example was given in which a man aged 36 years, who had been wearing for two years R. —8.00 sphere, L. —5.00 sphere, combined with +1.00 cylinder axis 90 degrees, found himself able to read with

comfort for hours upon wearing R.—11.00 sphere combined with +1.25 cylinder axis 90 degrees, L.—5.00 sphere combined with +1.25 cylinder axis 90 degrees; the vision of either eye as thus corrected being 5/6 partly. Patients who suffered from *nystagmus* often brought objects very close to the eyes in order to obtain accurate vision of small details, and in such cases, even in young patients, it was frequently justifiable to use a bifocal lens. Thus in a man aged 21 years who suffered from horizontal nystagmus, and who required a high plus spherical correction, headache which had persisted during one month on use of the distant glasses for close work had ceased upon employment of stronger spheres for near work; so that a bifocal addition of +2.00 D. sphere to the distant lens had been ordered and had proved very acceptable.

DISCUSSION. Melville Black, Denver. I have not been impressed with the improvement obtained in amblyopic eyes where the other eye had normal vision. I have endeavored in many young patients, especially squinters, to exclude the good eye and force up the vision in a poor one. I saw today a child of seven or eight years who has worn an occlusive bandage for four months continuously, and the vision in the amblyopic eye was and still is 20/200. On the other hand, in cases typified by a patient who accepts 0.50 D. cylinder in one eye and 4.75 D. cylinder in the other, and where the patients have come to me uncomfortable with such correction, I have frequently put a plano over the worse eye and obtained relief. The discomfort produced in such a case is due to the marked prism action of the very unequal correction; yet this trouble does not occur in other-cases of the same class.

J. J. Pattee, Pueblo. During a prolonged experience of Dr. Worth's very painstaking work in strabismus, I saw a large number of disappointing results after the use of amblyoscope and occlusion of the good eye.

W. H. Crisp, Denver, mentioned the case of a boy of 12 years in whom great

improvement as regards school work had followed prescription of bifocal glasses; and further suggested that in highly anisometropic patients it was occasionally advisable to try the use of one eye for distant and the other for near vision instead of prescribing bifocals.

A. C. Magruder, Colorado Springs, referred to the excellent improvement in amblyopic eyes sometimes obtained by the use of the high frequency current.

Dr. Black. I have used this method for twenty years, and it is not infrequent to see a gain of at least a line on the test card after five minutes, but in many cases the improvement does not stick, and on the whole the treatment is disappointing.

Dr. Libby. There is not always a difference in focus between the good and the amblyopic eye. I gave up exclusion of the good eye long ago. In the case I mentioned all that was done was correction of both eyes.

Wm. H. CRISP, Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA SECTION ON OPHTHALMOLOGY.

March 17, 1921.

DR. G. ORAM RING, Chairman.

The Modern Conception of the Anatomy of the Nasolacrimal Passageways in Man.

DR. J. PARSONS SCHAEFFER, gave a lantern demonstration of the anatomy of the nasolacrimal region. The strand of thickened epithelium along the floor of the rudimentary nasooptic fissure represents the initial stage in the development of the nasolacrimal passageways. The strand or cord of epithelial cells grows into the underlying mesenchyme, becomes entirely detached from the surface and encompassed by mesenchymal cells. The cord at this time is entirely solid and without connection with the nasal mucosa and the free border of the eyelids. From the solid cord of epithelial cells sprout both lacrimal ducts, the nasal end of

the nasolacrimal duct, and the cephalic portion of the lacrimal sac. The lumina of the several segments of the nasolacrimal passageways are established in a very irregular manner. The ocular end of the mother cord of the epithelial cells is the first to establish a lumen. The point of coalescence between the nasal end of the cord and the mucosa of the inferior nasal meatus is the last portion to become patent,—the lacrimonasal membrane 'rupturing' approximately at term. The horizontal portion of the lacrimal ducts establishes lumina before the vertical portion.

Many of the anomalies and variations in the anatomy of the nasolacrimal passageways encountered in infants and in adults are easy of comprehension and interpretation if one recalls (a) that the anlage or rudiment of the nasolacrimal passage ways is a solid cord; (b) that at one time the solid cord has absolutely no connection with the surface; (c) that the lacrimal duct, the cephalic portion of the lacrimal sac, and the nasal end of the nasolacrimal duct develop as secondary sprouts from the mother cord.

The cord of epithelial cells may at places remain solid, leading to atresias. One or the other of the lacrimal sprouts may fail to establish connection with the free border of the eyelid, giving rise to an absent duct. Multiple sprouts may grow to one or the other eyelid, causing a duplication, triplication, etc., of the lacrimal ducts. Additional sprouts from the sides of the solid nasolacrimal duct form the genetic basis of the diverticula encountered in later life. The coalescence of the solid lacrimal duct with the eyelids may be extensive, inviting the formation of a single, long slit-like ostium and of multiple ostia. The lacrimal sac may at an early time come in contact with the surface epithelium; canalization at such point would lead to a congenital fistula. Arrested development in the obliteration of the ocular end of the nasooptic furrow may be a factor in congenital fistulae. The several types of ostia nasolacrimalia in the inferior nasal meatus, found in the adult, are in accord with the potential-

ities of lumen formation at the point of coalescence of the solid epithelial nasolacrimal duct and the nasal mucosa.

The idea of an unvarying typical type of adult nasolacrimal duct and lacrimal sac, etc., must be abandoned. The newer anatomy of anatomic types is urged. This is more in keeping with the real anatomy than the notion of a typical form and all departures therefrom as anomalies. Recent investigations show at least two important types of nasolacrimal ducts are encountered: One type is more or less regular in contour and in direct line with the lacrimal sac with which it gradually merges. The other type is very irregular, somewhat tortuous and not infrequently connected with the lacrimal sac in a side-to-side union. Both types of ducts may have diverticula of various sizes. However, diverticula are more frequently encountered in ducts with irregular walls.

The nasolacrimal ostium, located in the inferior nasal meatus, is extremely variable in its anatomy. Two very definite types, however, may be mentioned: One type is located at the highest point of the inferior nasal meatus, immediately caudal to the attached border of the inferior nasal concha. Owing to adherence of the mucous membrane to the osseous boundaries, the nasolacrimal ostium stands permanently open, is wide-mouthed and unguarded by a mucosal flap or valve. Another type of ostium is located variously in the mucous membrane on the lateral wall of the inferior nasal meatus. Such ostia are slit-like and are usually guarded by a mucosal valve (Valve of Hasner).

In the endonasal operation on the lacrimal sac and upper segment of the nasolacrimal duct, one must recall that certain of the anterior ethmoidal cells, especially the frontal and the infundibular, lie in juxtaposition to these segments of the lacrimal passage ways. The same holds true for the prelacrimal recess of the maxillary sinus. These paranasal sinuses are readily opened into in this position. Of course, when the operation is done in the lower third

of the nasolacrimal duct, the paranasal sinuses referred to are not a factor.

Other factors being equal, it would appear from an anatomic viewpoint that an infected nasolacrimal duct and lacrimal sac would yield most readily to treatment in those cases in which the nasolacrimal ostium is large, permanently open mouthed and unobstructed by anatomic conditions of the inferior nasal meatus; moreover, in which the nasolacrimal duct is free of mucosal ledges and diverticula. On the other hand, one would expect infected nasolacrimal passage ways to resist treatment and the ailment to enter the stage of chronicity in those anatomic types in which the nasolacrimal duct contains diverticula (often without gravity drainage) and the nasolacrimal ostia are of small and inadequate size for efficient drainage; moreover, a nasal aperture or ostium so located that it is readily influenced by conditions of the inferior nasal meatus. The success or failure of non-surgical treatment of the diseased nasolacrimal passage ways is largely dependent upon the anatomic type of nasolacrimal duct and ostium encountered. In conclusion, the writer would urge the importance of the "anatomic type" clinically, not only in connection with the nasolacrimal passageways, but elsewhere in the body.

Operation for Intranasal Obstruction.

DR. SIDNEY YANKAUER, of New York, (by invitation) discussed the recent operative procedures for drainage thru windows resections and concluded that such procedures had usually failed to give permanent relief. He described his newer method of dissecting thru intranasal obstructions without distributing the lumen of the lacrimal canal.

Congenital Atresia of the Lacrimonasal Duct.

DR. WM. ZENTMAYER described the clinical manifestations, the complications and treatment of obstruction to the tear duct in the new born, and stated that, when cystitis develops, it is due to secondary infection. While there may be several causes for the

clinical symptoms, the usual one is the retention of the separated epithelial cells which go to make up the core from which the canal is later developed, due to imperforation of the septum (Hasner's valve) between the lacrimonasal duct and the nasal chamber. The affection appears immediately or a few days after the birth of the child, at which time a small amount of discharge is noticeable at the inner angle of the affected eye. Bulbar conjunctiva is usually normal or but slightly injected. There may or may not be fullness over the sac. Pressure applied over this region may cause a gelatinous white fluid to exude from the punctum, or may be followed by a discharge from the nose. The affection is rarely bilateral. Nature in time usually corrects the trouble; but at any stage, infection of the contents of the canal may result in the formation of an abscess. As one observer has found that 25 per cent of his cases of dacryocystitis occurred before the tenth year, it is likely that chronic dacryocystitis in the child may be looked upon as a sequel of untreated congenital atresia. As the possible results of delayed opening of the tear passages may be infection, it seems wise at once to secure proper drainage. This is readily done by the passage of a small probe thru the dilated punctum, the canaliculus, sac, and canal into the nose. Local anesthesia only is required. One probing in the vast majority of cases is sufficient.

Newer Mercurial Preparations of Service in Ophthalmology.

DR. T. B. HOLLOWAY referred to mercurophen, the product of the Dermatological Research Laboratory, which contains 53% mercury. He pointed out its very high bactericidal power as compared with other similar agents. In the laboratory tests, it was shown to be some two hundred times more active than bichlorid. He also referred to mercurochrome (220) and spoke of the laboratory investigations as conducted by Young, Swartz and White. Reference was then made to the comparative laboratory effects of

these two drugs on the tubercle bacillus as reported by Dr. De Witt. She believed that mercurophen particularly might be used with benefit in certain ulcerative lesions on account of its high bacteriostatic power. The recent report of Lancaster concerning mercurochrome was also referred to.

Dr. Holloway stated that he had had much greater experience with the use of mercurophen than mercurochrome, altho he was now using both drugs. He stated he had but little to add to what he had previously said in regard to mercurophen, but he believed this drug was most efficient against the pneumococcus, and as far as his personal experience was concerned, just as efficient as optochin. While mercurophen seemed to be the more active of the two drugs, it should not be forgotten that this product was used in the strength of about 1-8000 as an irrigating fluid, whereas mercurochrome was used in the strength of about 1-500 and usually instilled by the drop method. He felt, as so used, there was but little difference in their bactericidal action, as far as laboratory tests were concerned.

DISCUSSION. Dr. Geo. E. de Schweinitz expressed his high appreciation of Dr. Schaeffer's admirable address. He was unable, he said, to discuss from the practical standpoint, Dr. Yankauer's well-described operation for the relief of dacryocystitis, as the technic was essentially one which belonged to the operative work of a rhinologist. With Toti's, West's and Mosher's operations, he had had no personal experience. He maintained, as he had on previous occasions, that a well-performed excision of the lacrimal sac was an operative procedure of great value, which had given him satisfaction for many years, and which he believed in many circumstances was superior to any of the forms of intranasal operation to which reference had been made.

Referring to socalled dacryocystitis of infants—congenital atresia of the duct—he thought it might be arranged in two groups: (a) those which dis-

appeared without operation, the only treatment required being the instillation into the inner canthal area of a mild antiseptic fluid, followed, after systematic evacuation of the sac contents, by a gentle massage of the sac; and (b) those which required, in addition to this, the passage of a probe, readily inserted in the case of infants, to facilitate drainage.

He had found sulphat of zinc to be a useful collyrium, and had also employed argyrol, not, of course, by injecting it into the duct, but in the manner previously described. Recently, in several instances, he had employed mercurophen (1-10,000) for the same purpose, and also mercurochrome (1 per cent.). In a very few cases, owing to secondary infection, true purulent dacryocystitis supervenes in infants, and in these circumstances a more formal procedure may be required.

Dr. B. Alex. Randall said that it was at the suggestion of the late Samuel D. Risley that he made in 1881 a study of the lacrimal puncta and canaliculi, especially as to the presence of a definite sphincter at the punctum. Dr. Risley believed that many an epiphora was greatly relieved by dilatation of this narrowed opening and its behavior had strongly suggested a sphincter, altho this was denied by many authorities. Both in longitudinal and cross-section, such arrangement of the muscle fibers was clearly demonstrated, as shown in photomicrographs of Dr. Randall's preparations and by Merkel's picture in Graefe and Saemisch, and it was accepted by Leidy in his last edition. Among the eye instruments at the Episcopal Hospital when he took charge there 40 years ago, were lacrimal probes of v. Hasner, a right and left aneurism needle like instrument for use from the nose up. With such v. Hasner must have learned much practically as to the "valve" which he depicted and described in his book. Whether or not we accept his views, v. Hasner deserves full credit for emphasizing the essential importance of nasal inflammations, too generally ignored even today, in this connection.

The Maxwell Operation.

DR. WM. ZENTMAYER described the Maxwell operation, as he had performed it on both the upper and lower culdesac in a patient, seen at Wills Hospital, with a greatly contracted socket, and on whom several operations of different nature had previously been performed at another institution without success. He had found from previous experience that no special care had to be taken of the elevator of the lid.

Device for Spectacles for Infants.

- DR. J. HILAND DEWEY showed a spectacle frame and basket-like contrivance for holding a pair of spectacles on a four months' old infant. The frame has short temple pieces reaching to the temporal region, with a loop on the end of each for holding a short ribbon. From this ribbon run three other ribbons, which pass around the head to the temple piece on the other side, one ribbon below the occipital protuberance, one slightly above the first, and the third considerably higher. These are joined by several vertical ribbons, which give it somewhat of a basket-like appearance. With the growth of the infant the attachment of the ribbon at one of the temporal pieces may be readily lengthened. In this way indentation of the nasal bridge is avoided.

Suspected Foreign Body in the Posterior Chamber.

DR. HUNTER W. SCARLETT exhibited a young man, who sought treatment in January, 1921, for inflamed eyelids of one week's duration. In both eyes there was a low grade blepharo-conjunctivitis, but examination of the right eyeball revealed an adherent leucoma running from the limbus at about 10 o'clock, in toward the center for about 2 mm. A thick grayish membrane adherent to the iris, filled the pupillary area. Incarcerated in this membrane was a cilia extending from the internal margin of the nasal side of the pupil, across the pupillary area into the anterior chamber, resting on the anterior edge of the temporal side of the sphincter iridis.

In addition, by focal illumination, there was a small radial slit in the iris, extending inward from about 7 or 8 o'clock, and at right angles to this slit, a small shining body which resembled a piece of polished brass.

The patient gave the history of injury to the right eye in 1913 by a piece of metal, while he was hammering a percussion cap, which exploded. He was immediately examined at the hospital by an oculist, and a piece of brass was removed under general anesthesia. Since that time he had had only light perception in the eye. Following the removal of the metal, which probably was in the anterior chamber, an X-ray was made with negative results.

Since his examination in January last, three X-ray examinations have failed to reveal the presence of a foreign body in the eye. The case is shown because of the unusual form of the injury, the presence of the cilia retained in the anterior chamber during 8 years without causing any apparent disturbance, and the suspicious substance lying beneath the iris in the posterior chamber.

DISCUSSION. Dr. Wm. Zentmayer thought that the reflecting body seen behind the iris was a foreign body.

Congenital Bilateral Ptosis with Inability to Look Upwards.

DR. BURTON CHANCE reported the case of a negro, aged 23 years, with congenital bilateral ptosis, the edges of the lids covering two-thirds of the cornea. While the orbicularis reacted, there was no action of the levators. When a test object was carried upwards, there was at once a tilting backwards of the head and a sharp depressed convergence of the axes of the globes. When the lids were raised by the observer and a test object carried on upwards, the globes failed to follow it; but at once there set in a rapid rotary nystagmic movement of the left globe. In the horizontal and inferior directions, there was no interference with the ocular movements. Voluntary efforts at convergence were futile until, with the lids forcibly raised, the

object was carried thru an arc from 15° below to 15° above the horizontal. There did not seem to be voluntary oblique action. The eyes were normal in all other respects.

The mother and a brother, about 10 years older than the patient, had the same deformity. A younger sister has normally functioning eyeballs and eyelids.

DR. CHARLES R. HEED, Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

April 18, 1921.

DR. E. K. FINDLAY, in the chair.

Corneal Ulcerations.

DR. FRANK BRAWLEY: This patient came to me March 13, 1920. He gave a history of having had a foreign body in the eye, which he said he had rubbed out. The next morning the eye was filled with secretion. Cultures, using various media, have been made without finding any bacteria except an occasional staphylococcus. August 25th there were three superficial ulcerations which stained lightly for about two weeks time. They healed, leaving very fine nebulae. Every effort has been made to rule out all possible sources of trouble. Treatment has had no effect on the eye. The condition has continued practically the same. His vision on April 12, 1920, was 6/6 and today it was 6/30. I tried to exclude malingering on taking the vision.

Dr. E. K. Findlay saw the case with Dr. Brawley and suspected malingering.

Exophthalmos.

DR. MICHAEL GOLDENBURG. This case, a child, about six years of age, was brought to the clinic on the 29th of this month with the history that her eyes seemed to be growing larger for the past six months. A picture taken of the child about a year ago revealed no such condition. We found upon examination that there was a von Graefe sign, a Stelwag sign, and a hippus. The pupils were equal. X-ray and neurologic examinations were negative. Examination by an internist

disclosed nothing, with the possible exception of an enlarged thyroid. He states he found no evidence of hyperthyroidism.

DISCUSSION. Dr. Robert von der Heydt stated that as long as it is not known what is the matter, the child's eyes should be watched at night and the cornea that was exposed should be bandaged.

Dr. George F. Suker stated that this class of eye condition with the von Graefe sign was very misleading. He thought our conception of this sign was not altogether what it should be. It was not a simple and regular lagging in the motion of the upper lid downward, as the eye itself turns downward; but, it was the jerky manner in which the upper lid should follow the downward rotation of the ball—in other words, the rotation of globe and lid downward is not synchronous. If this was present, then there was a neurologic lesion; otherwise it was dependent upon the relationship between the anatomic position and size of globe to the eyelid and was mechanical in origin with this jerkiness in the upper lid action absent. This child had not the von Graefe lid sign as just detailed. It seemed to him, that as the child's mother had been of the same type, they were dealing with an affection or disassociation of action of the endocrin glands—either thymus gland or thyroid, or both. It was his opinion that it was a simple exophthalmos and not a thyroid exophthalmos.

Dr. Goldenburg, in closing, said that vision was 20/20 in the right and 20/25 in the left. The ophthalmoscopic findings were negative with the possible exception of a venous pulsation. He was fully inclined to think as did Dr. Gill, the neurologist, that the condition was an endocrin proposition.

"The Etiology of Uveitis."

Dr. Nelson M. Black, thought it generally considered at the present time that outside of cases of direct injury to the iris, ciliary body or choroid, there was no such thing as idiopathic uveitis.

The consensus of opinion as to the pathogenesis seemed to favor the toxic theory, altho some authorities believed

there was an actual bacterial invasion. The fact that many uveal manifestations cleared up quickly following removal of some well defined focus of infection in the body would incline one to accept the toxic theory. Those cases which did not improve or, at least, not in proportion to the improvement made in the accompanying malady, would suggest that the irritating factor in the uveal tissue was of a more tenacious character than a toxin and might be bacterial.

Syphilis had been relegated to a position of minor importance. Uveal disease from old gonorrhreal infections had not been given the consideration its importance deserved. Many of the cases formerly considered rheumatic, are gonorrhreal in origin. A thoro investigation of the genitourinary tract should be a part of the routine, especially in cases of uveitis with a history of former gonorrhreal infection.

Jackson is of the opinion that whenever clinical evidence of ocular tuberculosis is manifest, it is reasonable to assume a focus of previous infection.

The literature abounds with reports of cases of iritis, iridocyclitis and choroiditis of varying severity which are cured or greatly improved by removal of dental sepsis. The same was true with regard to foci of infection in the tonsils, the sinuses and occasionally from chronic ear disease.

Uveitis of gastrointestinal origin had been reported based upon the results obtained from correction of diet, relief of constipation and general improvement in nutrition. Rovinsky called attention to the possibility of the uveal tract being the seat of disturbance, the result of protein sensitization from ingested food.

Trantas found that lesions of the uveal tract constituted one of the important complications of relapsing fever. Gonzalez reported uveitis among other ocular complications in typhus fever, which Marin Amat considered was due to the toxins of the specific organism. Metastatic iridocyclitis occurring with paratyphoid fever was reported by Gilbert. Disturbance of the uveal tract after antityphoid

vaccination was reported by Calhoun. Influenza was frequently complicated by uveal diseases varying from the mildest form of ciliary injection to profound involvement of the entire tract with total loss of vision. Kiep observed some form of uveitis in 5 out of 19 cases of bacillary dysentery.

Lack of internal gland secretions as an etiologic factor was substantiated by cases reported by Bordley and Galezowski. Lavergne and Terrien had observed a few cases of uveal infection associated with cerebral meningitis which resulted in rapid loss of the eye.

The Pathology of Uveitis.

Dr. Sanford R. Gifford, Omaha, Nebraska: The ophthalmologist has less need of pathology in the old sense of gross and morbid anatomy than other clinicians, for he may observe in detail the greater part of pathology in the living state. To the binocular loupe and the ophthalmoscope is now added the Gullstrand slit lamp, by means of which lesions of the cornea, iris and media may be followed from day to day in microscopic detail. Therefore the ophthalmologist needs less than others to consult the laboratory man as to what mysteries have been going on in his patient. While all clinical types showed numerous exceptions, the typical cases according to their etiology presented certain pathologic differences which might often be made out clinically.

1. The cases, due to focal infection, showed an affection of the anterior layers of the iris with synechiae involving only the pigment epithelium, and seldom showed any formation of nodular infiltrates.

2. Cases due to lues and tuberculosis showed lesions of the deeper layers with broad synechiae including iris stroma. Nodule formation occurs in most cases, in many of which it could be seen clinically. The larger nodules of each disease were usually clinically distinct and cases of tubercular uveitis without demonstrable tubercles were relatively rare.

3. Sympathetic ophthalmia was

characterized by a diffuse mononuclear infiltration of the whole uveal tract which might often be made out clinically, especially where the fundus could be seen.

Symptomatology of Uveitis.

DR. WILLIAM H. WILDER said that uveitis manifested itself as a low grade inflammation of any part of the uveal tract, usually very insidious in its onset. It might not be noticed until the exudate into the vitreous and into the anterior chamber clouded the media and obscured the vision. If the lesion was mostly limited to the choroid, the symptoms and signs might not be as conscious as when the ciliary body or iris were the chief points of attack, altho it was to be remembered that all parts of the uvea might be affected, if not to the same degree.

Pain might not be noticed if the choroid was the part chiefly affected, for this part of the uveal tract was devoid of sensory nerves. However, even in posterior choroidal congestion and inflammation, a deep seated dull ache, sometimes described as a pain, might be experienced by the patient. If the ciliary portion of the uvea was much affected, the pain might be more marked, and there would be the distinguishing signs of cyclitis, viz: tenderness on pressure over the ciliary region. If the iris was much involved, there might be severe pain in the eye or pain referred to the temple, cheek or forehead.

One of the most constant manifestations in uveitis is the presence of deposits on the posterior surface of the cornea, and opacities probably of a similar substance in the aqueous humor and in the vitreous. These well defined dots on the back of the cornea, varied in size from dust-like particles to little masses 1 mm. in diameter. As expressed by Nettleship, the largest of them look like "minute drops of cold gravy-fat, the smallest like grains of grey sand." Broken down chromatophores or cells from the retinal pigment layer of the iris might furnish pigment to some of the little masses. According to Friedenwald,

the precipitates on the back of the cornea occurred in all forms of iritis and iridocyclitis at some time in the course of the disease, but in plastic iritis the masses of exudate were larger, clumped together, and fell to the bottom of the anterior chamber in the form of a hypopyon.

The degree of impairment of vision would depend upon the degree of haziness of the media and the extent of the involvement of the choroid and retina. If the macular region remained unaffected even with extensive involvement of the choroid, central vision might be only slightly, if at all, impaired.

Peripheral vision, as shown by the fields, might show all kinds of irregularities and contractions according to the degree and extent of the changes in choroid and retina. In extreme cases there might be atrophy of the optic nerve following upon degeneration of the retina.

As was usual in cyclitis or iritis, the tension of the globe was usually below normal. But one should not feel too secure about this; for even with the anterior chamber apparently deeper than normal, the tension might become elevated, sometimes to a dangerous degree.

He summarized by saying that in a general way uveitis was no more than iritis or an iridocyclitis of a socalled serous or serofibrinous character with coincident involvement of the choroid, more particularly the anterior portion. It was mild in degree, as a rule, and when so, might run its course without inflicting much damage to the eye. In its severer forms it might prove as disastrous as sympathetic iridocyclitis, whose clinical features it greatly resembled; altho they were by no means related.

The Treatment of Uveitis.

DR. J. BROWN LORING, stated that in the treatment of uveitis in general, it was necessary to make an individual etiologic case diagnosis, or treat symptomatically. We wished to relieve pain, prevent deformity, restore func-

tion and prevent recurrence of the attack.

Full dilatation of the pupil with atropin should be secured and maintained. Pain should be relieved as promptly as possible. No remedy, for relieving pain, reestablishing circulation and promoting absorption, equaled moist heat when properly applied. These processes should be assisted with powdered dionin. Eliminate thru all channels. In the deeper, more insidious forms of uveitis, the use of atropin was not so necessary. In the absence of a definite etiologic diagnosis, which required the greatest care to establish, the progress toward recovery was remarkably slow in many cases; whereas the detection and removal of the real cause was followed by very speedy relief.

In the forms of uveitis with increased tension, our success depended upon finding the etiologic factor and its removal, continuing, notwithstanding the increased tension, the use of atropin, together with the other remedies. This was noted particularly in the recurring cases from an underlying tubercular origin. If necessary an iridectomy should be done with a broad clean base, and treat the underlying disease. It was not so much the particular operation chosen to relieve the tension in these cases, as it was the thoro treatment of the underlying disease; the apparent recurring infection being due not to the form of operation, but to the lack of thoroness in the treatment of the disease.

In the gonorrhreal cases it was advisable, in connection with the foregoing treatment, to proceed at once with the treatment by vaccines. Then, if possible, secure an autogenous vaccine and continue the vaccine until all evidences of the disease had vanished. In the chronic recurring cases of uveitis of its various forms, subconjunctival injections of the cyanid of mercury or of the normal salt solution might be used.

DISCUSSION. Dr. Joseph L. Miller stated that he could discuss the question of focal infection in a general way or in the application to closely allied conditions, for instance, the question

of arthritis. There was no doubt of the relation between the invading microorganisms in arthritis and in iritis. The question is, "was the problem of focal infection one where one was actually dealing with a small focus of chronic infection or was it a focal infection in the sense that the infection went thru an apparently normal mucous membrane?" In pneumonia, for instance, it was known that pneumococcic infection went in thru the normal mucous membrane very commonly. The same was true of the meningococcus, which went thru the normal mucous membrane of the nasal passages into the brain. The same was true of poliomyelitis.

In observing the results one saw in acute arthritis, in the primary attack of any of these acute infections, one was hardly justified in saying that the removal of the focus of infection would prevent a recurrence. There were many cases with recurrence. If one could actually prevent a recurrence of the attacks, he thought he could feel that the focus was responsible for the attack. In an acute arthritis where there was a preliminary sore throat and the tonsils were removed, the patient the next time he got a sore throat had rheumatism. This had occurred so frequently that it seemed to him there was a great deal of evidence to show that the infection did not go thru the tonsils but entered thru the socalled normal mucous membrane. The same was true of chronic arthritis.

There were one or two other points he would like to call attention to, especially the significance of the tuberculin reaction, the local reaction one got in the eye following tuberculin injection. This had been considered as evidence that the patient had a tuberculosis. It had been shown more especially by Weichert that any protein injection, whether it be tuberculin or typhoid vaccine, would give rise to a local reaction. There was no temperature reaction, but one got a local reaction and it did not mean that the patient had a tuberculosis. One would find he would get the same reaction if one injected typhoid or any foreign protein. The

same might be emphasized when one spoke of the therapeutic value of tuberculin. There was a great deal of evidence accumulated to show that the effect of tuberculin was not due to tuberculin but due to the protein. Any foreign protein acted similar to tuberculin.

Another point brought out, was that, if there was a marked local reaction after removal of the tonsils, it might be taken as evidence that the tonsils that were removed were the source of the infection. He thought this was not necessarily true. Here again one had a protein reaction, that is, the operation permits the entrance into the circulation of quite a large number of micro-organisms from such an infected tonsil, just the same as one got a local reaction after tuberculin or after the injection of any other protein.

He was not sure whether this question of focal infection might not play a more important role in uveitis than in arthritis. He would emphasize that one must be very careful about extracting teeth. He thought one of the things that was going to reflect on the medical profession more than anything else as the physician of the future looked back on it, was the indiscriminate removal of teeth for every disturbance. He thought the tonsil was perhaps a little different, that is, one did not miss the tonsils; they did not serve any particular function.

Dr. William H. Wilder asked Dr. Miller regarding reactions obtained in an eye after injections of tuberculin. In an eye affected by uveitis, after a subcutaneous injection of a diagnostic dose of tuberculin, one might get a more or less marked reaction evidenced by an increased ciliary injection. How should such a phenomenon be interpreted? Was one justified in assuming that it was an indication that the eye was affected with tuberculosis?

Dr. Joseph L. Miller said that the general reaction indicated that the patient had tuberculosis somewhere; the local reaction indicated that the patient had an infected area. If one gave a patient with chronic arthritis a for-

eign protein or albuminose, within one or two hours the point would swell up and become very painful. If one gave a patient a tuberculin, he would get a reaction in the place of injection just the same. He would say the general reaction meant the patient had tuberculosis. The local reaction would only mean that the patient had an irritation which reacted.

Dr. Robert Blue stated that the writers of the first and second papers apparently did not agree on all points. Dr. Black stated that in the lesions of uveitis, bacteria were usually not present, while Dr. Gifford stated that in these lesions the bacteria were usually present, being carried to the uvea by the blood stream, either dead or living bacteria localizing themselves at some place in the uveal tract. All would certainly agree that the localization of bacteria in the uveal tract would cause an inflammatory reaction. One could also readily prove that uveitis could be produced without the presence of bacteria. Some years ago he performed a series of experiments on rabbits in which he introduced horse serum into the cornea of the eye, and two weeks later injected some of the same horse serum into the veins of the ears. Almost uniformly injection of the eye occurred, and in one case a posterior synechia.

Dr. Nelson M. Black in reference to Dr. Miller's mention of the fact that removal of the foci of infection in cases of arthritis was often followed by a recurrence of the arthritis, he merely mentioned the fact that removal of tonsils did not by any means remove all the chance of infection, as there remained the pharyngeal and lingual tonsil. The lingual tonsil might be a source of infection; further after removal of tonsils and teeth, which were possibly the primary foci of infection, the recurrent attacks of arthritis and uveitis might be due to the infection or bacteria within the joint or eye itself, transferred from the original source and now became the primary focus of infection. This would also account for those cases in which little or no improvement was seen when the tonsils

or infected teeth were removed late in the course of treatment.

Dr. Georgiana Theobald stated that in syphilis the lesions were usually larger and fewer in number; in tuberculosis they were usually small and more numerous. Syphilis was usually acute, while tuberculosis ran a more insidious course.

Dr. Theobald then showed slides of a case in which the pectinate ligament was blocked up by the serous exudate from an iritis which could easily cause an increase in tension.

Dr. Gifford stated that the metastases occurred in a large number of cases. He believed endotoxins could only be observed in small quantities in the eye, not in large enough quantities to cause uveitis, but he thought bacterial protein in the form of dead bacterial bodies could cause uveitis and possibly anaphylactic uveitis.

Dr. Harry Gradle stated that in recent years diagnosis had been aided by the use of the Gullstrand slit lamp. An inflammation of the iris could be diagnosed by this instrument considerably earlier than by any other methods, anywhere from 24 to 60 hours. There would show a dilatation of the vessels of the iris that was never seen in the normal eye.

Dr. William A. Mann spoke of posterior uveitis in which the only pathology was found in the vitreous humor. These cases were noninflammatory. There was usually a lowered vision—20/40, 20/50, 20/60, 20/70, and in the early stages no floaters were found. The only thing to be seen was a little bit of haziness that could be found by comparing the two eyes. In the other eye one got a clear view of the fundus; in the diseased one it was not so definite, but there was no redness and no inflammatory exudates. Later on his experience had been that these cases finally showed floating opacities, as if the minute particles clumped.

Dr. Robert Von Der Heydt stated that when the slit lamp was used it was not necessary to use any drugs for differential diagnosis. The condition in its very incipiency would show

without the aid of drugs. Another thing demonstrated was that when the exudate was thrown out onto the iris, pigment proliferation was so stimulated that within twenty-four hours, the whole mass was covered with new pigment. It was coated like a chocolate drop. It seemed that the throwing out of this exudate stimulated the pigment to proliferate; it acted like a fertilizer.

Dr. Wilder, in closing his part of the discussion, said that the consideration of the subject had been much broader than he supposed it would be. Speaking generally, uveitis would cover various inflammations of any or all parts of the uveal tract, but he supposed it was the intention to limit the subject to those mild and insidious forms to which special attention was given by many writers.

He thought Dr. Mann was quite right in saying that one must not expect to find continuously the precipitates on the back of the cornea or on the lens in a case of uveitis. They might come and go as the case varied in intensity, as might also the fine floating opacities in the vitreous. Diligent study of the case with enlarged pupils might be necessary to detect them in very mild cases.

He could not agree entirely with Dr. Gamble in regard to the vigorous and continuous use of atropin in such cases, and he thought it was wise to instruct students that they should be careful in the use of this drug. Some of these cases suddenly developed hypertension and miotics might be necessary or even paracentesis of the cornea. In the main atropin must be relied on to prevent adhesions of the iris, and to paralyze the ciliary muscle.

Dr. J. B. Loring said that in reference to the use of eserin in the treatment of these cases of uveitis, he thought most of us would agree that eserin if used should only be used temporarily. It lessened the hyperemia of the vessels for the time being and as soon as that hyperemia was lessened—it did not take but 24 hours—we should abandon the use of eserin and again resort to atropin. If used in a suffi-

ciently weak solution, there was no pain associated with it, the pain being due to the spasm of the muscle and not to a contraction of the vessels. If we observed this, we could with safety use eserin and alternate it with atropin, deriving some benefit from its use.

In reference to the early diagnosis of iritis, iritis rarely attacked both eyes at the same time. If careful pupillary reaction was taken, the eye that was affected almost invariably reacted more slowly than the other eye.

ROBERT VON DER HEYDT,
Correspond. Sec.

BUFFALO OPHTHALMIC CLUB.

DR. JOHN J. FINNERTY, Presiding.

March 21, 1921.

Cases of Ocular Injury.

DR. HARRY WEED presented a man who gives a history of being at work in a factory using a compressed air hose. The pressure of air ranges from 60 to 80 pounds and he wears a helmet with a wire gauze screen to protect the eyes. A blast of air was deflected into his eyes and particles of sand were taken from his eyes. When he first saw him the iris was tremulous and the lens was beginning to be opaque. Vision at the first observation was 20/40, and was steadily reduced until it is now 20/200. It has been stationary for the past two weeks.

In the other case the eye appeared just as it does today, except the tension was lower. On January 15th she gave a history of gradually failing vision over a period of several months. The only thing that seems to bear on it was, while walking along the railroad tracks about Easter time, she felt something drop into the eye; gradually the vision began to fail and she was having some pain. Tension at that time was Schiötz 5. She consented to come here but has refused an X-ray. Transillumination was negative except the upper portion of the iris was decidedly thin. He would describe the present appearance of the eye as an Elliot operation without iridectomy.

A Dermoid of the Orbit.

DR. F. PARK LEWIS showed a tumor which occurred between the lids in a patient twenty years of age. It has a yellowish brown texture, coming down to a pedicle. He thought before operating it was a remnant of a microphthalmos. The front of the tumor shows round and dotted lines as tho it might be a rudimentary iris. It was attached to a very firm pedicle as tho it might be a rudimentary eye tissue, but there was seemingly no eye in the orbit.

Therapeutics.

DR. HARRY GRADLE. I have recently been going over some of the drugs of the past few years and I think the use of some of those drugs is not as universal as it might be, because they are not as universally known as they should be.

Resorcin. The use of this drug in ophthalmology has been comparatively limited. Some twenty years ago my father used resorcin in cases of ulcerative blepharitis, 2% combined with precipitated sulphur in ointment form. This is combined with the usual local treatment of the conjunctivitis. However the use of the drug is limited there. Knapp of Basel suggested its use as an astringent, two per cent aqueous solution, in cases of low grade conjunctival inflammation. But there are certain contraindications. It has no value in purulent conjunctivitis. It is distinctly contraindicated in hordeolum and chalazion. It aggravates the case probably because of the closure of the mouths of the glands.

Another drug I have been using for about a year to some advantage is *Nisin*. It is a zinc product, and is used in about double the strength of zinc sulphat. It is slightly less irritating than zinc sulphat and it is more active upon the Morax Axenfeld bacillus.

The next drug along that line is a Dutch product, *fluorescein zinc*, a combination of potassium fluorat and zinc sulphat. This is used in a powder and is massaged into the conjunctiva. The presence of the powder causes lacrimation, and the tears dissolve the fluorescein

zinc, keeping the eyes bathed in a solution of the drug. That to my mind is the one ideal therapeutic agent we have in ophthalmology. This is of use in Morax Axenfeld bacillus infection and of no use in any other condition.

Mercurophen. This was devised by J. Shamberg in 1916. It has equal bactericidal properties with mercury bichlorid and oxycyanid. It is less irritating and distinctly less toxic. In the eyes it is used in the form of a wash. I have not found that mercurophen is able to clear up any type of purulent conjunctivitis alone but it is of great use in helping to clear up cases in conjunction with other remedies. One other use which mercurophen has is that it may be used in the disinfection of instruments. It does not affect them like mercury-bichlorid.

Mercurochrome. This was first proposed for use in gonorrhreal urethritis. In this respect, it failed to live up to expectations, but it can be used to great advantage in purulent infections of the conjunctiva and cornea in one per cent solution. Of course, a great many will object to its use on account of its stain. It has been used to as high as five per cent, but is very irritating. In purulent cases, I instill a drop every hour. In other cases three or four times a day. I have not used it in gonorrhreal conjunctivitis. It is not specific in pneumococci infections. In ulcers of the cornea, mercurochrome may be used in one per cent to five per cent solution and in severe cases it may be used in the form of a mud. It stains the cornea very intensely, deeper than fluorescein. It stands out as a brilliant red. In tear sac cases mercurochrome is of advantage. It may be used freely in the acute form of purulent dacryocystitis of children.

Holocain. There is one value holocain has which Dr. deSchweinitz taught me. In cases of socalled trophic or neurotrophic ulcers of the cornea, these small infiltrates lie near the limbus and holocain exercises a beneficial influence. From the standpoint of an anesthetic I have discarded it entirely, because we have something new.

Butyn. This I have been using for over six months. It is about one-half

as toxic as cocaine and has equal anesthetizing properties. It seems to have the power of penetrating the loose epithelium of the conjunctiva to a very great depth, and with three or four instillations a chalazion may be curetted without pain. It has no effect upon the tension of the eyeball. It does not affect the epithelium. The original preparation was put out as a succinat, which is not as good as the sulphat. It will stand boiling.

DISCUSSION. Dr. Lucien Howe. In regard to anesthetics, we have a number of them, and one says this is the best and another one says that is best. We have no criterion, but it is possible to obtain a numerical expression for the amount of anesthesia produced by cocaine or anything else. We know that any irritation of a sensitive nerve causes a rise in blood pressure. In other words we can determine from the blood pressure what the degree of anesthesia is. I think it would be a good thing if some of the young men would take this thing up and work it out.

Dr. Nelson Black. I have tried out at least two of the drugs Dr. Gradle has spoken of. I have met with unqualified success in the use of rescorcin. I remember he told me to use 2 per cent. I have been using three per cent solution. I have used it with a lot of men coming in with the ordinary forms of conjunctivitis and they are men who don't complain much of the use of the drug, but they do complain of the zinc solutions. I have used butyn in curetting chalazions and there has been no complaint at all, much less than where cocaine is used. I have used mercurophen in flushing out the conjunctiva and there has been no complaint of discomfort. As to mercurochrome, I have had the same success as Dr. Gradle mentions in purulent conjunctivitis. We had one case of gonorrhreal ophthalmia in a nurse, contracted at the County Hospital; and it seemed almost impossible to get rid of the bacteria. Mercurochrome 2 per cent was instilled every two hours and not until then was the smear negative.

Dr. Park Lewis. In removing chalazions there is an element of danger, where two or three of the tumors have to be taken care of at the same time. The action of cocaine is exceedingly uncomfortable. I would like to make mention of the use of *thymol* in one of the mineral oils. I use a one per cent solution, which is remarkably effective in follicular conjunctivitis in three or four days. Sometimes I use a 2 per cent. I have also used it in acute exacerbations of chronic trachoma.

Dr. Starr. I have had no experience with these drugs except holocain and resorcin. I like holocain in some forms of corneal ulcers. I think it is antiseptic and has a beneficial effect aside from its anesthetic effect. I have used resorcin to the exclusion of any remedy in the treatment of blepharitis for a period of twenty-five years. I usually prescribe it with salicylic acid, which prevents stain. I use salicylic acid 2 per cent solution with 3% resorcin in water. I would like also to mention a combination which I have used in purulent conjunctivitis, particularly gonorrhreal, with a great deal of satisfaction; and that is a mixture of 5% silver nitrat and pure phenol; about 30% of the pure phenol with 5% silver nitrat.

Dr. L. M. Francis. I have had some experience with mercurochrome but not in gonorrhreal conjunctivitis. It is very effective in purulent conjunctivitis and corneal ulcer. I now use it instead of fluorescein. It has one awkward feature, and that is its staining quality. Acidulated alcohol will de-

colorize it. The use of resorcin is new to me. Holocain I use in the form of an ointment.

Dr. Bennett. I am particularly interested in butyn. In removing chalazions so many patients faint. You can do an iridectomy and extract cataracts, and yet in the removal of a chalazion with cocaine you get almost always a syncope. Dr. Hubbell once taught me the correct treatment of ulcerated blepharitis. First remove the crusts and then brush the edges with 2% silver nitrat.

Dr. Phillips. I tried *acriflavin* in the case of a nurse who, from a bacteriologic examination had a pneumococcus infection. I tried optochin with no result. Using 1/1000 solution of acriflavin hourly it disappeared entirely. I have since then used it up as high as 1/50. I have used it in gonorrhreal ophthalmia, and not one of the cases went over ten days without a cure. I like it better than mercurochrome.

Dr. Gradle. Another thing I would like to recommend is the use of *urotropin* as a preventive of infection. We know that urotropin when taken by mouth appears in the aqueous humor in about 45 minutes after its primary ingestion in a concentration of 1/10,000 to 1/2,500, which is sufficient to act as a preventive against infection. After infection is established, urotropin is of no value. I give 1 gram at first and then half a gram three or four times a day.

H. W. COUPER,
Secretary.

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MONOCULAR DIPLOPIA.

The patient's complaint of double vision should lead promptly to the testing of whether it is binocular or monocular, by covering each eye in succession to see if this leaves diplopia with a single eye in use. This begins the diagnosis; but it is only complete when the exact cause of the doubling has been determined for each particular case, and the significance of what the diplopia implies has been worked out.

This condition has been rather inadequately explained in the text books; and the lists they give of possible causes are often confusing. It is possible for the symptom to arise from conditions of the refracting media and surfaces; from peculiar displacements of the retina; or, perhaps, as a symptom of disease of the central nervous system. Such conditions as opacities of the cornea or lens or polycoria are associated with monocular diplopia; but the cause of it is the accompanying disturbance of regular refraction, not the opacity or multiplicity of pupils in itself.

A simple form of monocular diplopia is produced in the Schreiner experiment. A card held before the eye, with two pin holes in front of the pupil, will make a distant light look double, if its rays are not perfectly focussed on the retina. This anyone can try by imitating in his eye hyperopia or myopia by the use of a concave or convex lens before it. Only when the light is perfectly focussed on the retina do the two images fuse into one. Another very simple form of monocular diplopia is produced by placing the edge of a prism before the pupil so that some of the light reaching the retina comes along side of the prism, while some is deflected by coming thru it. The same thing is done by looking thru the edge of a correcting glass, where a prismatic effect is produced.

The monocular diplopia, produced by imperfections of the dioptric surfaces or media of the eye or by polycoria, is like that of the above experiments. An irregular cornea has portions which are so inclined as to deflect the rays passing thru them, as does the

prism held partly in front of the pupil. The opacities, that accompany such irregularities, tend to render the separate images more distinct. The same is true of irregularities in the crystalline lens, whether these are irregularities of surface or of refractive index, and the opacities that appear with them. In polycoria, the different openings in the iris correspond to the different pin holes of the Schreiner experiment, producing diplopia when the light entering the eye is not perfectly focussed on the retina. And in polycoria, one or more of the pupils is generally situated so far toward the periphery of the iris that the focussing of the light, entering thru it, is certain to be imperfect.

It is not generally realized how marked a monocular diplopia may arise from imperfect focussing (diffusion phenomena) thru a normal pupil of not unusual size. Looking at a white line on a black ground with a strong spherical lens or cylinder with its axis parallel to the line, will serve to bring out this kind of diplopia; which appears as a duplication of outline, rather than the perception of separated distinct images. This kind of diplopia is complained of by patients suffering from uncorrected ametropia of high degree, and is more noticed when the regular error is supplemented by irregular astigmatism.

The diplopia, that may arise in detachment of the retina, may be binocular, due to displacement of one retina so that it receives on an abnormal portion an image, the counterpart of which is normally received on the retina of the other eye. It may, however, be monocular, the light impressing both layers of a folded retina, one layer lying behind the other; or fall upon two folds that are in close juxtaposition. In either case, the double images are so faint or indefinite that they are not much noticed unless the sight is very defective in both eyes.

About the double vision noticed in connection with cerebral disease, our knowledge is not very definite. In

most cases, the occurrence of such images has not been shown to have any definite relation to the anatomy and physiology of the visual centres. In this the double vision closely resembles the paresthesias of hysteria, and probably in most cases the diplopia is hysterical in character. It is well known that in connection with organic brain disease, hysterical symptoms are apt to arise. But these cases should be studied in minute detail to ascertain if there is any basis other than that of suggestion to account for them.

All cases of monocular diplopia are worthy of close study, and they may help to throw important light on the origin and prognosis of the conditions on which the diplopia depends, or with which it is associated. In a large proportion of instances, there are more than two images present, polyopia; but the fewer the images the more readily they can be studied. A first step toward finding the full significance of the diplopia is to ascertain in which part of the pupil each particular image takes its origin. In a case of partial cataract, as that reported on page 673, this one fact may indicate swelling or shrinking of the crystalline lens, and thus add definiteness and certainty to the prognosis.

The connection with a particular part of the pupil is established by covering that part with a corner of a card, and having the patient notice that the image in question disappears. Changes in the images, and therefore in the conditions of the cornea or crystalline lens that cause them, may often be discovered by placing the patient in a certain definite, easily reproduced position with regard to a point of light; and having him make a drawing of the images he sees. The change in such images, produced by viewing them thru different convex and concave lenses, will sometimes help to determine their significance. Studies of such multiple images, made with care and accuracy, will generally be found interesting, and often afford important practical help.

E. J.

SURGICAL ASEPSIS IN OPHTHALMIC OPERATIONS.

Recent observations thruout a number of American ophthalmic surgical centers bring strongly to mind the fact that the eye surgeon is by no means in the same class as the general surgeon, as regards certain points of technic and especially asepsis, and this applies not only to the average man, but to the leading operators as well. Little can be said but of praise as to their surgical diagnostic ability and their manual dexterity; but when it comes to the finer points of actual asepsis our surgical confreres, especially those who do abdominal operations, laugh at us.

God has indeed been good to the oculist—even in the old days of the frock coat donned in the morning, worn to the consulting room, in the street and crowded clinics and never even taken off for the washing of hands in the operating room. The ectodermic tissues of the eye, as has the lining of the nose, constantly exposed to atmospheric microorganisms have acquired a certain immunity. But let the globe once be opened the mesoderm is a fertile pabulum for disease germs. True it is that our hands and fingers do not come in direct contact with the tissues; and, if our instruments be sterile, nature forefends what few germs enter the bulb and it is not necessary for absolutely complete "surgical lingerie." Few of us care to diminish our *tactus eruditus* by the use of rubber gloves, as does Barraquer; and few of us go to the opposite extreme and rub the lids, or even press on the cornea, with the bare finger, as does Henry Smith.

What we particularly wish to call to the attention of ophthalmic operators, is the possibility of the present rate of intraocular infections after opening the globe, being diminished by the use of the head covering and the mouth mask, neither of which was much in evidence in the Eastern eye clinics and hospitals recently visited. Is not our hair always full of dust—of scales which carry infections, as well as innocuous germs; and which fall off

in a shower when we stoop over, and certainly get into the eye of the patient in the customary posture in the operating room? Do we not also note the aura of steam extending a couple of feet from our mouths and nostrils, on a freezing day? Because we cannot see this in ordinary temperature, that is no reason for forgetting its existence.

Expired breath contains many droplets of water mixed with mucus and microorganisms. Then, too, every time we open our mouths to talk, actual drops of spit may be expelled with some force, for several feet, and saliva is certainly not clean. I know several world-famous operators with whom it is no pleasure to talk face to face, for they always unknowingly actual spit in the visage of the vis a vis. Especially in lecturing over a subject in the operating room, it is necessary to have a face mask and cap in addition to the usual operating gown and general care, for observers, assistants and principal operator. Thus we may not only lessen our infections, but our incomplete efforts at asepsis will cease to be a joke to the general surgeon.

H. V. W.

BOOK NOTICES.

Regional Anesthesia, (Victor Pauchet's Technic), by **Sherwood-Dunn, M.D., Officier d'Academie, Surgeon (Colonel) Service de Santé Militaire de Paris, Physician to the Cochin Hospital.** With 224 Figures in the Text. F. A. Davis Company, Publishers, Philadelphia. 1921.

This book is one of the most astounding contributions to medical literature, of the decade; almost, it may be said, of the century.

Special surgeons, as well as those doing general work, have constantly practised local anesthesia. Indeed, present ophthalmology would be practically impossible without the local anesthetics. The same may be said of the operations in the nose and larynx.

Here the procedures have been so elaborated and yet so simplified, that almost any, even the most formidable

operations on any part of the body, seem adapted to this form of anesthesia. See the photographs of the smiling faces of the patients in the midst of operations for appendectomy, amputation of an arm or leg and extensive thoracic operations, and, most astonishing of all, during operations on the head, as, for the removal of the superior maxilla, which is simply astounding! True it is that some of us have enucleated eyes under local injections into the orbital tissues and by blocking off the ophthalmic nerves, done excision of the tear sac and plastic or minor operations on the face; but, when it comes to the Kroenlein operation, to craniectomies and to frontal sinus operations, under infiltration and regional nerve blocking, we are indeed appalled at the seeming audacity of the authors and would require proofs of the veracity of their statements, if we did not know that there are such things as spinal anesthesia, nerve blocking, infiltration and contact anesthesia.

The reviewer is also somewhat amazed to find that the credit for infiltration anesthesia, by weak solutions of cocaine, is ascribed to Prof. Reclus of the Paris Faculté, dating back thirty years, for it was his impression and he had much experience with it in 1893-4, some twenty-eight years ago, having introduced the method into America, in an abridged translation of Dr. C. L. Schleich's (of Berlin, Germany), work on "Schmerzlöse Operationen," followed by several other papers and many demonstrations of its use in general as well as special surgery. Is it that this German obtained the method from the Frenchman, without giving him credit; or, is it the reverse? [Reclus seems to have called attention in 1889 to local anesthesia by injection of cocaine solutions, and Schleich within a year or two later to "infiltration anesthesia." E. J.]

Be this as it may, the present author, Sherwood-Dunn, following Reclus, Pauchet, Sourdat and Laboue, combines the infiltration of the skin and subdermal tissues with nerve blocking.

The medicaments used are as follows:

- (1) 25 drops of 1 to 1,000 adrenin solution to 200 mils of $\frac{1}{2}\%$ procain solution;
- (2) 25 drops of adrenin to 100 mils of 1% procain;
- (3) 25 drops of adrenin to 50 mils of 2% procain;
- (4) 25 drops of adrenin solution to 25 mils of 4% procain.

Twenty-five drops of the adrenin solution is the equivalent of 1 milligram of adrenin. The 4% solution is used but seldom for the cranial nerves and brachial plexus; the 2% solution frequently, as a rule for the nerve trunks; but the 1% and especially the $\frac{1}{2}\%$ solutions are those most commonly employed, the latter for all infiltrations.

Regional anesthesia may be availed of in 80% of surgical operations. Its success depends upon the ability and experience of the operator, but the disposition and mental attitude of the patient also play an important part. Beginners are invited to use it not only in one type of case, but systematically in all cases, holding themselves in readiness to use ethyl chlorid to complete the work where necessary.

Cranial nerve anesthesia and the paravertebral, brachial plexus and transsacral procedures, which are most efficacious, require actual training. If the advice to learners is followed, this should not take a long time. Take a hatpin and skeleton and practise introduction into the cranial foramina, as well as into the paravertebral and sacral openings, in accordance with the landmarks mentioned in this book. Such practice will require one or two hours. The same experimentation should then be carried out upon a cadaver. This will also require about two hours of practice. After these two series of experiments, trials may be made upon the living subject.

For the remaining operations, trials should be made with the book by one's side, as is done by the internes in the author's service. Be gentle, patient, and persevering in spite of failures and the aversion of certain patients, and you will succeed with signal benefit to most cases and with general advancement of surgical practice.

The advantages of the procedures are low mortality risks, reduction of postoperative dangers, diminution of shock, absence of danger from asphyxiation and special advantages in certain operations, as bronchial tumors, laryngectomy, nephrectomy and cranial operations.

Complete anesthesia obtained by nerve blocking lasts from $1\frac{1}{2}$ to $2\frac{1}{2}$ hours. It is usually complete; but, if necessary, a few inhalations of ethyl chlorid may be given. Morphin-scopolamin, hypodermically administered, assists the general analgesia and makes a quiet patient, fully conscious and able to assist the operator in many ways. The anesthesia is distinct from the operation, it being done beforehand, and is complete in fifteen to thirty minutes.

There is no danger of necrosis of the tissues from nerve blocking; there is no vomiting and the operations are less bloody. Special training is required, but may be accomplished by the skilled surgeon or his assistant after a few hours study. There is necessity for gentleness and skill. The psychology of the patient must always be considered. Special syringes are advisable, with needles of various sizes and lengths, and the medicaments are capped in sealed, sterile ampoules. The mechanical procedures of the operations are those in ordinary use.

The procedures described in this book cannot be abstracted, as the language is boiled down to the limit of full technical description, and it must be read word by word and page by page, and then read over again. It is so interesting that the reader can hardly stop; so valuable that the special and general surgeon should have it as a guide, at his right hand, on his desk and in the operating room.

H. V. W.

Traité Complet de Thérapeutique Oculaire Générale et Spéciale. Dr. A. Darier, Ancien Président de la Société d'Ophthalmologie de Paris. Revised Edition Octavo 727 pages. Paris, Jouve et Cie.

This treatise, containing about twice the matter of Sydney Stephenson's

translation of the first edition, fully justifies its claim to completeness. It might well have been put out as an encyclopedia of ocular therapeutics, altho this is a subject to which a very large amount of new matter is added every year.

Its first part, on General Therapeutics, opens with a section of 28 pages devoted to a summary of tieologic diagnosis. This includes: clinical diagnosis; anatomicopathologic diagnosis; experimental and serum diagnosis; therapeutic diagnosis, and symptomatic medication. It might be thought strange that an account of ophthalmoscopy with redfree light and of the Gullstrand slit lamp, should open a work on therapeutics. But it must be remembered that refined and effective therapeutics is often but little more than exact and refined diagnosis; and these recent aids to exact diagnosis must reveal many facts that will be of greatest practical usefulness in therapeutics. Under serum diagnosis we find the long series of reactions ranging from the Abderhalden to the Wassermann, with information that will help the searcher for light on therapeutics.

Next follows the section of 70 pages on biologic therapeutics equally full of material that has come into the literature since the first edition of this book was published. Of course "paraspecific serotherapy" comes in for extended notice. Parenteral injections of milk also are referred to. Methods of application of medicaments, the importance of general treatment in ocular affections, physical agents and topical applications to the eyes complete the first part.

The second part devoted to Special Therapeutics takes up in detail the treatment appropriate to each class of diseases, as those of the lids, lacrimal apparatus, conjunctiva, etc. Glaucoma is considered under the heads; prodromal, irritative or inflammatory, chronic, simple, secondary and hydrocephalus. While the various methods of surgical treatment are mentioned, little is said of them. On the other hand, the surgical treatment of

cataract is accorded 15 pages; taken up, however, with indications and complications, rather than details of technic, except as regards the anesthetics and other medicaments.

The body of the work is supplemented by a ready reference list of pathologic conditions arranged alphabetically, each with the appropriate remedies referred to and the pages on which these are discussed. This occupies 22 pages. It is followed by an alphabetic list of the principal medicaments employed in ophthalmology, which takes up 15 pages. Apart from these there is no index, but there is an extended table of contents and, near the end of the book, a summary by chapters.

The impossibility of making such a work perfect, or of keeping it so while coming thru the press, is illustrated by the absence of mention of recent cures of vernal conjunctivitis and tumors with radium; or the exact application of heat by the Shahan thermophore. There will be a demand for an English translations of this book, in which these few omissions might well be supplied.

E. J.

Textbook and Atlas of Diseases of the Eye. Edited by Th. Axenfeld (Friburg i. B) in collaboration with L. Bach (deceased) (Marburg), A. Bielschowsky (Marburg), A. Elschnig (Prag), R. Greeff (Berlin), L. Heine (Kiel), E. Hertel, (Berlin), E. v. Hippel (Halle), E. Krückmann (Berlin), J. Oeller (Erlangen), A. Peters (Rostock) and W. Stock (Jena). Sixth Edition—with 12 lithographic plates, 2 colotypes in the text and 636 illustrations, for the major part in colors. Gustav Fischer in Jena, Germany, 1920. (See also p. 147).

It is a pleasure and at the same time highly educational to review a book of this caliber, because a comprehensive review can be based only upon a careful study of the book in question. Let us consider it chapter by chapter.

In the Pathology and Therapy of Diseases of the Eye by Axenfeld, a

general survey is made. It is interesting to note that in the use of salvarsan, it is advised that small doses be given in the beginning, but that it is without danger to the eye or optic nerve. Parenteral milk injections are still considered in the light of an experiment, altho the reported results are not questioned. The chapter on Examination of the Eye, by Axenfeld, is fairly comprehensive, altho considerably more attention could be paid to retinoscopy. The newer instruments such as the slit lamp, the Gullstrand ophthalmoscope, etc., are merely mentioned and not discussed at length.

Elschnig deals with Ophthalmoscopic Differential Diagnosis, and that part dealing with the nerve head and its excavation is excellent. "Every excavation that reaches the margin of the disc and has even one edge overhanging is pathologic. The bending of merely one vessel at the disc edge of an excavation is diagnostic of glaucoma." Choked disc is classified under Optic Neuritis, and it is rather remarkable to find that the author still considers it as an inflammatory condition.

The chapter on Physiologic Optics and Function Testing by Heine is simple and rather clear. He does not dip into the deeper mathematics, but his refraction could be improved upon. Some of the more modern methods of Function Testing are omitted or merely mentioned, but it must not be forgotten that these have not won a thoroly established place as yet. Disturbances of the light sense are dealt with at length, evidently influenced by the large number of cases of disturbed dark adaptation found in the field during the war. The Disturbances of Motility is written by Bielschowsky and is very good, as far as it goes. However, but little attention is paid to the heterophorias and none to the treatment thereof. The discussion of nystagmus is comprehensive and clear.

Von Hippel contributed an excellent and concise chapter on the Development of the Eye and Congenital Anomalies. The same author wrote

on Diseases of the Lids, an instructive chapter and well worth reading. The Lacrimal Apparatus was written by Stock and is more elementary than any other chapter in the book. One of the illustrations, that of Mikulicz's Disease, is evidently an old wood cut and should be relegated to an antiquarian museum, rather than adorn the pages of a modern textbook.

But the Conjunctiva by Axenfeld is a masterpiece, with every sentence pregnant and deserving of careful study. Of great interest to the American Ophthalmologist is the considerable space devoted to the differential diagnosis between follicular conjunctivitis and trachoma. The author acknowledges that in some cases, an absolute differential diagnosis is not possible until the milder therapeutic measures have been used. Gonorrhœal Ophthalmia and Inclusion-body Blennorrhea are differentiated as separate diseases and the presence of the Prowazek bodies is diagnostic of the latter, altho it is questioned whether they are the exciting factor. It is rather interesting to note that Axenfeld states positively that trachoma is clinically and experimentally proven to be a contagious disease with an incubation period of from eight to fourteen days.

The Cornea by Elschnig is on a par with the preceding chapter. The complete disc Keratoplasty (von Hippel type) is recommended as a standard procedure if the proper indications are present, showing that abroad this operation has passed the experimental stage. Phlyctenular disease is blamed upon the "exudative diathesis" both by Elschnig and Axenfeld. In parenchymatous keratitis, salvarsan has not proven any more beneficial than has mercury and iodid, but nevertheless, the arsenical preparation should be used to prevent the occurrence of other luetic manifestations.

The vascular anatomy of The Uvea is dealt with at length by Krückmann, who states that "the majority of inflammations of the anterior uvea are caused by circulating microorganisms and not by their toxins." Unfortunately (according to our concepts),

rheumatism is considered as one of the main etiologic factors of uveal disease and "gout" relegates focal infections to a minor position. Furthermore, it is rather startling to read that the vitreous is considered purely ectodermal and that there is no hyaloid membrane.

The late Prof. Bach wrote the chapter on the Lens, which was revised by Axenfeld. The important work published by Vogt in the last few years is not mentioned, but otherwise the chapter is fairly complete until the surgery of the lens is considered. The expression of the lens as practiced by Smith is merely mentioned and the reader is warned against it. The Intraocular Exchange of Fluids and Glaucoma is by Peters, who is a firm adherent of the Leber theory of the formation of the aqueous and who maintains that the intraocular tension depends to the greatest extent upon the vascular pressure. The clinical classification and the description of glaucoma of various types is excellent and it is very noticeable that the operative therapy is discussed at length before the medicinal treatment is even mentioned.

Under Diseases of the Retina by Greeff, the etiologic factors of disease, as understood and searched for in this country, are discussed at length for the first time in the book. The anatomy of the retina and retinal disease is well handled, altho we are not accustomed to make a lethal prognosis in cases of nephritic retinitis. The operative treatment of detachment of the retina is discussed, but the author seems to have but little faith in it. X-ray treatment of the glioma *may be tried* in hopeless cases.

An equally good chapter is that on the Optic Nerve and Visual Tract, also by Greeff. In this, the disturbances of the visual fields are very well analyzed, altho the discussion of the etiology of neuritis is not sufficiently extensive. He adheres to the mechanical theory of choked disc and considers that puncture of the corpus callosum is the simplest and earliest treatment of papilledema. Retrobulbar neuritis of

rhinogenic origin is recognized as a separate clinical entity, and "in case of suspicion of disease of the accessory sinuses, immediate operation is indicated."

A short, but good chapter on The Orbit is by Peters. Hertel wrote on Injuries, War Injuries, Sympathetic Ophthalmia, and Compensation and his chapter is well illustrated. He gave the percentage of eye injuries in the World War as between 5 and 10% as compared to 0.86% in the war of 1870. The Sweet method of localization of foreign bodies does not receive the attention to which it is entitled and, according to our concepts, too much reliance is placed upon the sideroscope. The effects of war gas and the therapy indicated are gone into at length, a radical innovation in ophthalmic textbooks. The text is completed by a compilation of the Eye Conditions secondary to General Systemic Disease by Heine. The twelve illustrations of the fundus by Oeller are excellent.

On the whole, this is one of the best Ophthalmic Textbooks that has appeared. The printing and the illustrations are excellent and there are evidences of careful proof reading. No separate chapter is devoted to anatomy or pathology, but each chapter opens with a short anatomic description. The pathology is inserted as it occurs and is comprehensively illustrated.

Harry Gradle.

Defective Ocular Movements and Their Diagnosis. E. and M. Landolt. Paris. Translated by A. Roemmle and E. W. Brewerton, London. 100 pages, 27 illustrations. London, The Oxford Press.

This book has been published for some years, but it should be better known to English reading ophthalmologists. As the authors state in their preface: "We have not attempted to write a hand book but merely a handy book, a guide to aid the student and practitioner in finding his way over the oculomotor system, a path on which it is so easy to go astray."

The matter is arranged under: Anat-

omy and Physiology, Disturbances of the Movements of the Eye, Paralytic Strabismus, Strabismus Resulting from a Lesion of the Centres Governing the Symmetrical or Associated Movements of the Eyes, and Affections of the Ocular Mobility Following a Lesion of the Centres of the Equilibrium of the Body and Eyes (Paradoxical Affections). These titles have evidently been chosen after careful consideration and are worthy of thought.

They reflect a view of the disorders of the ocular movements very different from that set forth in most text books, or expressed in the usual paper, reporting the results of operations on the eye muscles; one that is more in accord with the sound views of physiology and conducive to the safer treatment of patients. The difference between an operator and a surgeon is nowhere more frequently illustrated than in the field of "operations on eye muscles;" and no class of cases more needs management with a broad view of the issues involved than these cases of defective ocular movement.

To get his early impressions of this field of practice from a book of such safe and sane view point, and minute consideration of methods of diagnosis, is a piece of rare good fortune for the young ophthalmologist. He should make himself thoroughly familiar with every part of it. Its brevity and condensation make it a book to be studied, digested, and applied in the study of cases and also in the study of other literature relating to the same. When one has mastered and used the book in this way, the fact that it has a rather imperfect index will be of small importance.

E. J.

Squint: Its Causes, Pathology and Treatment. By **Claud Worth, F.R.C.S.** (Fifth Edition).

The writer has given commendatory reviews of the four previous editions of this work, and this is no exception. Worth's opinions as to the causation and cure of squint, be it apparent or

latent, i. e., a heterotropia or a heterophoria, have gradually been accepted by the profession, so that there now are but few neglected cases, or those inappropriately or insufficiently treated, where the oculist has had the opportunity to apply his skill.

The erroneous idea formerly current, that a child "may grow out of the squint," is passing into oblivion. Worth shows that true squint is due to want of, or imperfect development of the fusion faculty, preventing the development of binocular vision; and is not in its beginning due to faulty insertion of the tendons, of the recti muscles or a paresis of the muscles. Heterophoria, however, is usually due to misplacement of these insertions. Moderate degrees of heterophoria are compensated for by the fusion faculty. High degrees of this latent squint need operation. A large proportion of cross-eyed children who are brought to the surgeon within the limits of time for the development of the fusion faculty, have this deformity corrected by glasses and development of this faculty secured by exercise of the fusion centers.

As regards operation, naturally Worth adheres to his own. He has practically, as have most of us, given up the operation of tenotomy, and advances the muscles. The reviewer has done this operation many times, but prefers an advancement and shortening operation which does not leave the resultant scar, and where there is no danger of going through the sclerotic, such as in that of Lancaster.

We hope to see in the next edition the assertion that "partial and repeated tenotomies are commonly done in America" expunged, for this method of treatment is certainly not in common use and is condemned by nearly all our surgeons. Previous editions of this work have doubtless been read by all those now in practice. The amendments and new subject matter included in this last edition render its possession valuable.

H. V. W.

Be Beautiful in Glasses. Frank G. Murphy, M.D. Mason City, Iowa. 16 pages, illustrated.

This pamphlet, in which more than half the pages are occupied with illustrations, is out of the lines of literature usually addressed to the ophthalmologist. Its author says that twenty-five years in active practice as an oculist have convinced him that there is a demand for such a treatise. When we consider how many patients have failed to receive the benefit that glasses would give because they think wearing glasses would make them "look horrid," it can readily be understood that the subject has practical importance.

The illustrations are diagrammatic, too much so to be always convincing; but they help to set forth ideas regarding the selection of frames that should be more generally considered. The work attempts to utilize certain principles regarding optical illusions that should be availed of to add to the pleasant impression of the face, rather than suffered to detract from it.

E. J.

CORRESPONDENCE.

IMPRESSIONS OF VIENNA CLINICS

A. S. GREEN, M.D.

SAN FRANCISCO, CAL.

R. PACHECO-LUNA, M.D.

GUATAMALA, C. A.

On the surface, Vienna shows but little alteration from what it was seven years ago, and apparently offers all its former charm and attraction. A little closer observation, however, reveals that life there is different now. The people are more shabbily dressed. To conserve light, cafes and theatres close at about ten o'clock at night. There are very few automobiles in evidence. The gaudily dressed officer or soldier of former days is conspicuous by his absence. These are the outward symptoms of a people in distress. Nevertheless, Vienna is crowded and the hotels are filled with foreigners from

adjoining countries, for whom living is very cheap on account of the rate of exchange.

The *Algemeine Krankenhaus* looked just as we last saw it in June, 1914, but the personnel of the ophthalmic sections has changed. The clinic of which Professor Fuchs was Hofrath, is now headed by Professor Dimmer with Purtscher and Lindner as assistants. Professor Meller is head of the clinic where Dimmer formerly was.

Professor Meller received us very graciously and explained the present state of affairs in the clinic and the prospects for the future. At the outset we may assert that Americans are very welcome at the clinic. Courses in Histo-Pathology, Ophthalmoscopy, operating, and so forth, are being given to the visiting physicians. The classes are small as yet, but are constantly growing. Professor Meller expressed the hope that the American Medical Association of Vienna would again be organized to facilitate the formation of classes and the arrangement of courses as was done before the war. The tuition fees are not increased, they are the same in dollars as formerly. Consequently, the cost of postgraduate study in Vienna is less than in pre-war days because living is so extremely cheap. One can live very well on \$30.00 to \$40.00 a month. An American physician informed us that it was costing him only \$20.00 per month, living in a good pension. This is made possible by the low rate of exchange in favor of the dollar, which at the present writing, April, 1921, buys over 600 kronen.

For money one can have anything with the exceptions, perhaps, of fresh milk and cream, and imported Havana cigars. But for the Austrians, especially the professional people and those with fixed incomes, it is an entirely different story. The incomes of the latter have increased but little. As a can of condensed milk costs 120 kronen, a pair of shoes 4,000 to 6,000 kronen and a suit of clothes 20,000 to 30,000 kronen, new clothes are out of the question. This accounts for the

shabby appearance of the best classes. Many homes are mere shells, for they have been stripped of pictures, rugs and bric-a-brac to buy the necessities of life. Two to three thousand kronen a week is considered a good income for a physician, which is hardly enough to keep away hunger. A doctor told us of an instance where a certain professor actually died from starvation because his pride prevented him from seeking charity. In spite of this want, the population is quiet and amiable towards foreigners, whose visits it regards as one of the means by which the Austrian capital can be kept alive.

Professor Meller informed us that his clinic still receives the prewar allowance of 3,000 kronen a year to run on. As the *American Journal of Ophthalmology* costs them over 6,000 kronen, one may readily see how far this allowance reaches. But somehow, they manage to do the splendid scientific work they always did. The Vienna eye clinics are equipped with red free light and Gullstrand slit lamps, while, with the exception of Switzerland, they are practically still unknown in the other European clinics which we visited.

For the benefit of Medicine, we believe that the Vienna clinics should receive the support and encouragement of the Medical Profession of America.

Near Vision With Distance Lenses.

To the Editor: I read with a great deal of interest an article by Dr. F. Park Lewis, entitled "Focal Adjustment in the Aphakial Eye;" also a history report by Dr. Wm. R. Fringer, entitled "Aphakia, Near Vision with Distant Glasses," both published in your JOURNAL April, 1921. I, also, have had a case of aphakia where the patient used the same lens for both distant and near vision. I removed a cataract of the senile variety from the right eye of a woman 50 years of age in 1909. Vision in this eye had only equaled light perception for thirty years. There was no history of trauma. The left eye had been blind from a central leucoma for about the same period of time. This

condition was caused by a corneal ulcer.

Due to the fact that the incision was too small, there was some difficulty in removing the lens, nevertheless this was successfully done intracapsularly. Following the operation the wound refused to unite, and only after strenuous efforts were made did the union take place four weeks after the operation.

When I refracted the case I was very much surprised to find that the patient was able to read 20/25 without any correction, a minus 0.50 enabled the patient to read 20/20 with ease. The patient also surprised me by her ability to read Jaeger 0.37 m. with a range of two or three inches either with or without a minus 0.50 sphere. This vision continued good, she stated, until about two years ago, when her distant vision commenced to fail. Since her operation she has read several hours each day with ease.

I did not see the patient again until recently. On March 15 she came in for refraction and I fitted her with a

plus 1.00 ax. 90°, with which she was able to read Jaeger 1. distinctly at 14 inches. Her distance vision had dropped to about 15/100 minus 1. This was improved to 15/100 plus with her correction. It also increased her ability to read Jaeger No. 1. Minus lenses did not help distant vision.

I found upon ophthalmoscopic examination a general disseminated choroiditis, but the macula was not directly involved. However there was a small spot the size of a disc diameter just above it. This must account for diminished central vision both for distance and near.

I believe this case is interesting from an optical standpoint, because of the fact that she must have had at least .10 diopters of myopia with a very small range of accommodation, even before the cataract developed. Also because it supports the theory advanced by Dr. Lewis as to the part placed by the vitreous humor in accommodation.

Sincerely yours,
CHARLES J. ADAMS,
Kokomo, Indiana.

ABSTRACTS

Moretti. Tenotomy and Muscular Advancement. Arch. di Ottal. v. 27 p. 159.

The author sums up some of the arguments in favor of both methods and decides that each has its place in selected cases. In cases of convergent squint his procedure is:

1. If the squinting eye is amblyopic and cannot be corrected by glasses, there is no object in doing an advancement as no functional result can be expected. If the deviation is more than fifteen degrees, a complete tenotomy is done and if this does not produce enough effect, a tenotomy of the other eye, complete or incomplete, according to the indications, is done later. If the original squint is less than fifteen degrees, a partial tenotomy is done, usually on both eyes.

2. If one eye is capable of useful function orthophoric methods, including muscle exercises and exclusion of the fixing eye are given a thorough trial and operative procedures undertaken only when they have definitely failed. If a purely functional squint remains without organic contracture of the muscles, an advancement is done. If the squint is less than fifteen degrees, an advancement is usually sufficient. If over fifteen degrees, a later tenotomy on the internal rectus of the same eye is usually necessary and in many cases is followed by a tenotomy on the internal rectus of the other eye if any deviation is left. If, after advancement, there is considerable enophthalmos and still some squint remaining, an advancement may be done on the other eye to make the deformity symmetric. The author describes his procedure by which he avoids the necessity of cutting a muscle, which he calls myotenorrhaphy. A conjunctival incision is made, the tendon isolated by two hooks, and a long incision is made in its middle, being longer in proportion as the deformity is marked. One double armed suture passes thru the belly, the needles being brought out thru the conjunctiva above and below the globe. When

these are tied, the muscle belly is drawn close to the tendinous attachment, the strands being arranged in a flattened T. Two supplementary sutures are placed thru the conjunctiva and the scleral attachment while the assistant holds the eye out. Both eyes are bandaged for five days, after which the sutures are removed.

S. R. G.

Hagen, Sigurd. Reforming of Aqueous. Norsk Magazin for Laegevidenskaben, v. 82, p. 1.

It has been previously determined that if a rabbit's eye is subjected to irritation, either by the subconjunctival injection of hypertonic salt solution or by the evacuation of the anterior chamber, two phenomena appear: (1) the intraocular pressure increases in a few minutes but becomes subnormal inside of an hour, and (2) a marked increase occurs in the secretion of aqueous, which contains, in contradistinction to the normal aqueous, much albumin and fibrin. This increased flow of aqueous is proven to originate from the ciliary vessels thru a hyperemia.

The author, by experiments on a human eye, found that by evacuation of the anterior chamber, the normal intraocular pressure was reached only after an hour and a half, altho the chamber was refilled in four minutes. The newly formed aqueous did not contain more albumin than normal aqueous, or fibrin. He concludes that in the human the immediate reformation of the aqueous takes place from the vitreous by filtration thru the zonula of Zinn but the secretion from the ciliary blood vessels proceeds very slowly.

D. L. T.

Jocqs and Reinflet. Primary Circular Ulcer of The Margin of The Cornea. La Clinique Ophtalmologique, v. 25, 1921, p. 183.

The patient, aged 41, complained that the right eye was a little red and accompanied by some uneasiness. In

the superior internal region of the periphery of the cornea is presented a linear ulceration like the lines of the engraver, with clean edges about one mm. wide and six mm. long. The bottom and also the border of the ulcer is slightly white. The rest of the cornea is normal. There is a moderate pericorneal vascularization on the nasal side, tho it is not associated with an inflammatory reaction. The aqueous is transparent, the iris is normal and reacts to light. There is no photophobia, nor pain and the cornea has a normal sensibility.

He likens the condition to the ulcer of Zur Nedden; "the primary marginal ulcer," tho not exact for it is more regular. He does not accept that it is due to an organism and doubts that any organism could produce such a circular ulcer.

T. J. DIMITRY.

Magitot, A. Motility of the Iris, and the Preponderance of the Dilatator System. Ann. d'Ocul. v. 157, 1920, p. 332-352.

In this extended article, the author discusses the above questions under the following heads:

Vascular Theory. This explains the contraction and dilatation of the pupil upon the basis of a dilatation and contraction respectively of the iridal vessels. Altho there are undoubtedly slight movements due to these causes, and altho an inflammation of the iris with an overfilling of the vessels will cause a contraction of the pupil, the theory cannot explain the normal movements.

Vasomotor Influences. The existence of vasomotor influences upon the iris has been proven. But from the experiments of certain authors, it is possible to conclude that this is not the cause of the pupillary movements.

Inhibition Theory. This explains the dilatation of the pupil on the basis of inhibition of the action of the sphincter, permitting the action of the normal elasticity of the iridal tissue. This factor certainly exists, but it is insufficient to explain, by itself, the pupillary dilatation.

It is accompanied by a contraction of an antagonistic system.

Iridal Musculature and the Two Antagonistic Muscles. The existence of a dilatator pupillae is generally accepted today. However, there are arguments against it, so the author gives a review of the arguments pro and con. His conclusions are:

(1) There is a dilatator force; (2) It is more powerful than the contracting force; (3) It is less affected by slight stimuli; (4) It can cause a local action in the iris, while that of the sphincter is more general; (5) It is governed by nervous influences from the cervical sympathetic via the long ciliary nerves; (6) This dilator force is present thruout the whole iris.

Is the socalled dilatator muscle, which is so delicate that it might rather be called a dilatator layer or myoid membrane, sufficient to cause dilatation of the pupil?

Arguments for: (1) Staining by picro-fuchsin; (2) The layer seems proportionate to the thickness of the sphincter; (3) It is composed of epithelium. The sphincter and ciliary muscles are likewise epithelial; (4) A stronger current is needed for dilatation than for contraction; (5) The physiologic dilatation has a very localized action; (6) Certain nocturnal birds of prey have a striated muscular layer in the region occupied by the myoid layer of the mammalia.

Arguments against: (1) A decided difference in the proportions of the sphincter and dilatator in spite of the preponderance of the dilatator force; (2) Henle's membrane nowhere shows waving or concentric folds when the pupil is dilated; (3) It ceases at the base of the iris. There is a space between the root of the iris and the ciliary processes. Nevertheless, excitation of the sympathetic will cause an increase in the dilatation of a pupil already under the influence of atropin; (4) The layer does not appear until the 7-9 month of pregnancy. Magitot has shown that in prematurely born children, photomotor reflexes exist as early as the 6th month, and are well developed by the 7th month:

(5) Compared to the sphincter, Henle's membrane has rather the character of intradermal muscles or the contractile cells of the glands. Its innervation should be of the same order, whereas, it is possible to dilate an isolated area of the pupil, but not to contract.

The preponderance of the arguments would seem to be against, but there seems to be no other muscle, capable of taking its place as a dilatator. The recent microscopic studies of the living eye would indicate that there are contractile cells in the stroma. It would seem that one of two positions must be taken; either the stroma is contractile, which would explain the power of the dilatation, or it is not contractile, in which case it is necessary to find another structure which will augment or replace the myeloid membrane of Henle.

C. L.

Jendralski, F. Radiotherapy in Tumors and Tuberculosis of Eye and Its Surroundings. Klin. M. f. Augenh. v. 65, 1920, p. 565, and v. 66, 1921, p. 96.

Jendralski reports on the results of radiotherapy systematically applied at the eye clinic of Prof. Uhthoff within the last few years. Seven cases of glioma retinae are reported in detail. Primary radiation, even in high doses was of no avail, and prophylactic radiation of the wound cavity, after operative removal of the eye yielded results only in 2 cases. In concordance with Axenfeld, the author believes that primary radiation should be reserved for glioma of both eyes. Patients with glioma of one eye ought to be operated upon and radiation be applied to the orbit to prevent relapses. From the observation that in an unsuspecting looking orbit the growth of the tumor in the depth undoubtedly progressed in spite of radiation, Jendralski considers primary radiation of one sided glioma as dangerous. Clinically and anatomically the cases showed that glioma is more or less radiosensitive. Axenfeld and Uhthoff saw fibrous alterations in the tumor and the affected retina. Even large doses of radiation

had no deleterious influence on the growing brain of the children. In 2 patients, whose eyes were in the glaucomatous stage of the growing tumor, radiation reduced the intraocular pressure. This perhaps may be in connection, partly, with reaction of the tissues with hyperemia, partly with relaxation of the pressure of the growing tumor by drainage of the tumor cells.

Radiation of sarcoma, especially of the lids and orbit was not encouraging. The essential data of 7 cases are given. Relapse, spreading, metastasis could generally not be prevented in spite of most intense radiation of the area, freed by operation as much as possible from the tumor tissue. One patient died after a short duration of the disease, 4 were discharged with bad prognoses, and only 2 remained doubtful. Jendralski contends that it is not advisable to start with radiation, on account of the great tendency of growth that at first is an operable sarcoma, to be converted into an inoperable one.

In 11 cases, excepting one of carcinoma, the diseased parts were radically removed and, as soon as the wound permitted, it was treated with radiation. Thus in 2 cases relapses were prevented so far after as 4 and $3\frac{1}{2}$ years. Corresponding to the experience of others, results can only be expected in a very superficial seat of the tumor. Postoperative radiation must begin very early. In inoperable carcinomas radiation may alleviate the distress of these unfortunate patients by influencing the growth and disintegration of the tumor, since no remedy is able to influence the cells of malignant tumors in a similar manner as radiotherapy, Jendralski recommends it in all cases.

Finally an angiomatous tumor of the upper lid of a child, aged 3, is mentioned in which radiation caused redness and ulceration of the skin, but subsidence of the tumor.

C. Z.

Dor, L. Antagonism Between Retinal Detachment and Posterior Sclero-choroiditis. *Revista Cubana de Oft.* v. 11, 1920, p. 100.

The author believes that there is some exaggeration in many cases on the part of some physicians concerning detachment of the retina in myopia. He considers that there is only danger in cases that do not have any choroidal complications, but when there are marked zones of choroidal ruptures, there is no danger of detachment of the retina. To illustrate this, Dor describes several cases, and affirms that detachment of the retina never occurs in myopic eyes with posterior sclero-choroiditis. He therefore recommends to myopes with extensive and numerous lesions of the fundus, to read and work, as there is no danger whatsoever of their having any detached retinae.

F. M. F.

Bruckner, A. Diseases of the Optic Nerve and Nasal Accessory Sinuses. *Zent. f. d. ges. Ophth. u. i. Grenz.* v. 3, 1920, p. 545-558.

This is a review of relations between retrobulbar neuritis and diseases of the accessory cavities. The author states that it is incomplete on account of the inaccessibility of non German literature. The first note of the above relationship is a note in Beer's textbook that "black Cataract" can appear following a suppressed cold without a perceptible appearance of mucus in the frontal sinus.

Frequency. The percentage of occurrence is not exact, as the diagnosis is often only a probable one. According to different authors, the percentages of rhinogenous retrobulbar optic neuritis ranges from 3.5% to 17%. It is probable that the smaller number is nearer correct as some of the cases diagnosed as rhinogenous were probable cases of multiple sclerosis.

Pathogenesis. Most of the cases are caused by affections of the sphenoid or posterior ethmoid cells. When adenoids are considered the cause, the condition is probably the result of

rhinologic association. The method of involvement of the nerve is not exactly known, but it probably arises thru a collateral inflammatory edema of sheath and possibly the nerve, which exerts a deleterious effect, either by its pressure or by the retention of the products of metabolism. It is possible that this is complicated by a transmission of the toxins along the lymph sheath of the vessels. If this lasts long enough, cellular infiltration, even migration of bacteria may take place.

Symptom Complex. There are two forms of rhinogenous neuritis, an acute and chronic. In the acute, the symptoms are very similar to those of cases due to sclerosis. Protrusion of the eyeball, slight dilatation of the pupil and pain on pressure on the ball or movement of the eye are either doubtful or not characteristic of rhinogenous affections. The disc may be normal or show a slight blurring. Later there may be a paleness of the temporal part of the whole disc, with a slight irregularity of the margins. The concentric contraction of the visual field is not as important as the central scotoma, usually relative, and increase in the size of the blind spot. This scotoma later becomes absolute and may increase to total blindness, the rapidity of this marking the difference between the acute and the chronic forms. As the condition improves, the last symptoms to appear are the first to disappear, so that there often remains an enlarged blind spot. The appearance of this symptom in this disease has been denied, and it is certainly not a constant one nor one found only in this disease.

Diagnosis. This is always very difficult, and often is only a probable one. It must be diagnosed from those cases due to multiple sclerosis, myelitis, toxic, hereditary, diabetic and those which are a part of an infectious multiple neuritis. The nose itself may give no aid, as it may appear normal. A prompt subsidence of the symptoms following endonasal treatment indicates a nasal origin.

Prognosis. This is uncertain on account of the uncertainty of the diagno-

sis. In general, the earlier the diagnosis and the prompter the treatment, the better the prognosis.

Therapy. Altho improvements may occur spontaneously or as the result of treatment of nonsurgical character, this is so doubtful that an operation should be performed as soon as the diagnosis is established. It should be performed also when there are good grounds for suspecting the cause to be in the cavities, even tho this cannot be proved.

C. L.

Baldino, S. Passage of Heterologous Sera from Blood Stream into Anterior Chamber. *Archivio di Ottalmologia*, v. 27, p. 77-83.

The author attempted to determine by anaphylactic reactions whether heterologous serum can pass from the blood stream into the anterior chamber. He did this by injecting beef serum into the anterior chamber of rabbits after having removed the aqueous, making, at the same time, deep scarifications on the posterior surface of the cornea. After two weeks, he injected the same serum intravenously into the rabbit, then removed the aqueous and made similar cuts on the posterior surface of the cornea. The second injection was followed by no more severe reaction than the first. To the author, this seems to prove that the serum did not pass into the anterior chamber from the general circulation after the second injection. He believes that the ciliary epithelium acts as a dialyzing membrane which allows only certain substances to pass and which keeps back the substance in the heterologous serum which produces anaphylaxis. This result is interesting in view of Guglianetti's apparent proof that an animal's own serum passes into the aqueous after paracentesis. Evidence of this he found in the fact that animals injected with this aqueous showed local and general anaphylaxis when injected after a sufficient period with the serum of the same animal from which the aqueous was obtained.

S. R. G.

Koeppen, L. Diffraction Grating Theory of Glaucomatous Rainbow Vision. *Klin. M. f. Augenh.* v. 65, 1920, p. 556.

The examination with the slit lamp with micrometric intravital measuring methods opened the way for an analysis of diffraction of the subjective phenomena of color of the living eye. After exposition of the different kinds of gratings in physical optics, Koeppen applies the grating theory to the structures of the refracting media of the eye in intravital observations with the slit lamp. Under normal and pathologic conditions, he distinguishes which is of especial differential diagnostic importance, in the following formations of subjective colored rings in the living ocular media:

(a) The precorneal or lacrimal Meyer's colored rings of from 1.25 to 2.50° angle radius in red. This phenomenon is found in conjunctivitis or slight irritation of the conjunctival sac, and in the presence of finely distributed ointment on the cornea. (b) The rings due to diffraction of the corneal corpuscles, which physiologically and in glaucomatous corneal stasis without inflammation have in red an angle radius of from 1.50 to 1.75 and seem to coincide with Meyer's rings. (c) The lenticular color rings frequently observed in normal eyes with medium sized and dilated pupils of from 3.5 to 4° radius in red, owing to radial grating of the living lens fibres. (d) The rings of from 5.5 to 8° in red in the preglaucomatous and glaucomatous attacks of increased tension without any inflammatory signs. These vitreous rings seem to be due to simple space grating of the vitreous structure which optically becomes more opaque by the increased tension, because the measuring of the diffraction constants of the grating of the vitreous approximately corresponds to the distance relations of the filtrations of the vitreous.

Hence Koeppen urges, in patients who complain of seeing colored rings, the measuring on Igersheimer's disc

the angle radius of the rings, for the differential diagnosis of true from spurious glaucomatous colored rings.

C. Z.

Bachstez, E. Anatomy and Origin of Socalled Evulsion of Optic Nerve. *Klin. M. f. Augenh.* v. 65, 1920, p. 827.

Bachstez examined a boy, aged 15, who was accidentally shot with a revolver in the left temple, with exit in the right temporal region. After 2 weeks amaurosis with normal appearance of the eyes. Ophthalmoscopically, R. a hole at the site of the optic nerve, surrounded by white foci and hemorrhages. L. secondary atrophy of disc, hemorrhages, white foci and pigment changes at the macula. The patient died from meningitis 4 weeks after the injury. Autopsy: The white foci proved to be due to necrosis of the retina. The lamina cribrosa was torn all around from the wall of the scleral canal and with the head of the optic nerve dislocated 1 mm. backward within the dural sheath.

A synopsis of the anatomic changes in the cases recorded in literature shows that 2 types of injuries must be distinguished. In type 1, the optic nerve with its dural sheath is torn from the posterior pole of the eyeball which is easily explained by a very intense trauma.

Bachstez's case belonged to type 2, in which the dural sheath remains intact. Its explanation is more difficult. Bachstez points out the diversity of injuries of this type, and the great number of explanations given in the literature. He concludes that in most cases of this kind it is not logical to speak of an evulsion of the optic nerve, but much more correct to designate it as an atypical rupture of the sclera in the area of the lamina cribrosa, caused by sudden rise of intraocular pressure by the impact. He discusses the supposed mechanism in detail.

C. Z.

Rumbaur, W. Histology of Iritis and Congenital Lues. *Klin. M. f. Augenh.* v. 66, 1921, p. 61.

Rumbaur adds a new case to the 4 cases, histologically described, of primary iritis in congenital lues, in a girl, aged 24 days. Both eyes were moderately irritated, diffuse opacities of both corneas, iris dirty grey and hyperemic, in the left some small yellowish greyish mass in pupillary area, anterior chamber shallow, tension increased. Iridectomy. No inflammatory symptoms of eyes after 13 days. The right eye remained well, but new exudations and adhesions occurred in the left eye with subsequent hydrophthalmus. The excised pieces of iris showed diffuse chronic inflammatory infiltration of the whole tissue with lymphocytes and plasma cells, and transition into cicatricial sclerosis, without essential involvement of the blood vessels. All the other cases showed this lack of vascular changes, which is an important difference from the acquired lues. As the vascular system is the tissue of the human body which has the most active function, Rumbaur thinks the less used up vessels of young children are more resistant to the invasion of the luetic virus.

C. Z.

Huber, O. Inflammatory Pseudotumor of Orbit. *Klin. M. f. Augenh.* v. 65, 1920, p. 718.

A soldier, aged 20, who for 11 months worked very hard in dusty rooms, as war prisoner in France, noticed in June, 1917, sudden failure of the sight of his left eye with severe pain. He then was interned in Switzerland and, on July 6, 1918, came to Huber V. = 0. The eye deviated downward and to the temporal side. The finger could not be introduced between bone and the exophthalmic eyeball, but felt a strong, little elastic resistance. Media clear, immense choked disc of 9 D, i. e. 3 mm., slight peripapillary edema, no hemorrhages. General examination negative. K. I. had no effect. Exenteration of orbit on July 9. The orbital tissue consisted of

coarse fibrillar tissue, with scanty vessels and cells, scattered plasma cells and lymphocytes, at some places conglomerated to heaps, similar to lymph follicles. The choroid was hyperemic, the disc edematous, veins enlarged, small perivascular infiltrations of the sclera near the disc with plasma cells and lymphocytes. Diagnosis: Chronic retrobulbar inflammation. Examination of the blood showed slight increase of erythrocytes and white blood corpuscles.

On August 27, the patient commenced to complain of headache on the right side. The right disc was very hyperemic and showed 4 D., refraction difference from the macula. Under iodin, mercury, quinin and arsenic, the condition in the orbit was the same. The patient was then repatriated and has not been heard from since.

Huber recommends in all doubtful cases of this kind internal treatment with arsenic and antiluetics, especially K. I. However, one must consider that after exenteration of one orbit, the other may become affected in the same way in spite of energetic general treatment.

C. Z.

Rochon-Duvigneaud. Simple and Double Foveae in Retina of Birds. Ann. d'Ocul. v. 157, 1920, p. 673-680.

There are 3 types of birds: (1) those with a single fovea, almost central, whose optic axes make an angle of

about 120° in birds with small beaks, and an angle of more than 120° in those with a large beak; (2) those with a double fovea, one of which has a position corresponding to the preceding, while the other is posterior and inferior to it. They are separated from each other by a distance which is proportional to the diameter of the retinal sphere. These are diurnal birds of prey, which have large heads and optic angles often less than 120°; (3) those with a single fovea lying lateral or posterior. These are the nocturnal birds of prey. In these, the optic axes make an angle of 90°.

In mammals, e. g. the cat, where the optic axes angle is about 95°, an illumination of one eye will cause some contraction of the pupil of the other protected eye, proving that there exists a binocular vision. But in the third class, in spite of the smaller angle, illumination of one eye has no effect upon the pupil of the other, showing the independence of the eyes. This independence is probably due to the relation of the visual axes. In birds with lateral eyes, whether the fovea is single or double, there is no position of the head where they will meet. In the nocturnal, predaceous birds, where the foveae are eccentric, there is likewise no meeting point of the visual axes, and consequently no binocular vision. C. L.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu. Volunteers are needed in other localities.

DEATHS

Dr. J. W. Chamberlain, St. Paul, Minn., aged 64, died June 15th.

Dr. Richard Kalish, New York, died June 21st from heart disease, aged 67 years.

Dr. Alfred D. Sawyer, Fort Fairfield, Me., died June 20th from cancer, aged 66 years.

D. J. Paes de Carvalho Sobrinho, a rising ophthalmologist of Rio de Janeiro, died recently, aged 34.

Dr. C. Herman Thomas, Philadelphia, died June 28th, 1921, aged 82.

PERSONALS

Dr. Arnold Knapp of New York City, sailed for Europe July 16.

Dr. Burton Chance, of Philadelphia, is spending a few weeks in Europe.

Dr. Eldridge Adams, formerly of Trinidad, Colorado, has removed to San Antonio, Texas.

Professor W. Uhthoff retires this year from the chair of ophthalmology, of Breslau, having reached the age limit.

The honorary degree of Doctor of Laws has been conferred upon Dr. Freeland Ferguson by the University of Glasgow.

A Christie Reid, D. O., has been appointed Surgeon to Nottingham Eye Infirmary, vice Col. H. Herbert resigned.

Dr. Wm. H. Crisp, Denver, is making a two months automobile tour in the East, having extended it as far as Portland, Maine.

Doctors Tribble, Black and Nims announce the formation of a clinical group. They are located in the Thompson building, Hot Springs National Park, Arkansas.

Col. Henry Smith of India was a San Francisco visitor during July. Doctor Smith gave a very interesting talk before the San Francisco County Medical Society on his personal experiences in medicine and surgery.

Dr. Geo. H. Woodruff, who was graduated from the medical department of the University of Illinois in 1920, is now serving an internship in St. Luke's Hospital, Chicago, in the eye, ear, nose and throat de-

partment. Dr. Woodruff is the son of Dr. Harry W. Woodruff of Joliet, Illinois.

Dr. F. S. Owen, Professor of Ophthalmology, University of Nebraska, spent a very pleasant and profitable vacation in the Hawaiian Islands. He recommends very highly a trip to the islands as a sure cure for that tired, run down feeling.

Dr. Homer E. Smith, the originator of the Smith-American operation for immature cataract, was one of the prize winners in the contest for the best essays on "Group Diagnosis" instituted by the New York Diagnostic Society.

Dr. John W. Thompson returned recently to Pueblo, Colorado, from Philadelphia, where he has been doing clinical work on ear, nose and throat the past year. He will resume practice in association with his brother Dr. Henry M. Thompson. The latter will continue as heretofore, to limit his practice to ophthalmology.

SOCIETIES

At the annual meeting of the Ophthalmic Section of the College of Physicians of Philadelphia, the following were elected to serve as officers for 1921: Chairman, Dr. G. Oram Ring; Secretary, Dr. C. R. Heed; Executive Committee, Dr. H. F. Hansell, Dr. W. T. Shoemaker and Dr. G. E. de Schweinitz.

MISCELLANEOUS

Under the will of Mrs. Ellen V. D. Hazelton of New York, the New York Eye and Ear Infirmary was bequeathed the sum of \$10,000.

A marble bust of Prof. E. Fuchs, Vienna, was unveiled June 14; the occasion being his 70th birthday. He retired from active practice in 1915.

The Catholic Archdiocese of New York has purchased two four-story brown stone houses in East Seventy-ninth street, for \$65,000, to be used as a home for blind children.

A large statue of Donders, the Holland ophthalmologist and physiologist, was recently unveiled at Utrecht, where he had

been Professor of Ophthalmology until his death in 1889.

J. E. McDaniel, found dead in a gas filled room in his home in El Paso, July sixth, left a will in which he bequeathed all the money he had after paying funeral expenses to the Kansas School for the Blind—about \$500. McDaniel was formerly a switchman at Kansas City.

The Trunk Line Association has granted to the fellows of the American Academy of Ophthalmology and Oto-Laryngology, an extension of time on the purchase of return tickets at half fare rates, from October 26th, as previously announced, to November 1st, 1921, providing three hundred and fifty tickets are purchased on the Certificate Plan.

Can sight be restored by the process of transplanting a normal eye in place of a blind one? Medical circles in Vienna, according to newspaper reports, are discussing this question as the result of a lecture recently delivered there, at which the claim was made that experiments carried out have proved sight can be thus restored.

Any oculist contemplating a visit to the Hawaiian Islands is requested to communi-

cate with Room 44, Alexander Young Building, Honolulu, for any information desired; also to call at the above mentioned room upon arrival at Honolulu. Honolulu is the place to get rid of that "tired feeling." The finest surfing in the world with the thermometer around 80 F, the trade winds blowing a gentle breeze and everybody as happy as a lark.

EDUCATIONAL

On the occasion of his "Fortieth Class Reunion" from the Medical Department of the University of Michigan, Dr. John E. Weeks of New York established a scholarship for research work in ophthalmology to be known as the "John E. Weeks' Scholarship Fund for Research Work in Ophthalmology." This scholarship is to be open to graduates or undergraduate students with the understanding that research work carried on in this scholarship should be under the direction of the Professor of Ophthalmology in the University of Michigan. The beneficiary may receive the award one or two years in succession as the committee may decide but no one is to receive the award more than twice.



PAPILLOMA OF CORNEA. (GARRAGHANI) 10

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PAPILLOMA OF THE CORNEA.

EDWARD F. GARRAGHAN, A.M., M.D.

Assistant Eye Surgeon, Illinois Charitable Eye and Ear Infirmary.

CHICAGO, ILLINOIS.

In the case here reported the growth recurred showing the tendency of such tumors to become malignant. Other cases of the kind are cited. Read before the Chicago Ophthalmological Society.

The following case is reported because the papillomatous type of neoplasm involving the cornea, is exceedingly rare. This case came under my observation at the Illinois Charitable Eye and Ear Infirmary on September 24th, 1919.

HISTORY. Mr. G., age 70, married, father of nine children, wife living. Father died when patient was four years old, cause unknown. Mother died at age of 61, cause unknown. No history of malignancy in family. Stone cutter by trade. Smokes moderately. No history of injury. Patient states that about thirteen months ago he first noticed a small red spot on the eyeball at the inner canthus. This small tumor like mass gradually increased in size and spread out until at present it covers four-fifths of the cornea.

He has never had any pain and there has been no hemorrhage. Only its gradual increase in size and unsightly appearance, with a gradual narrowing of the field of vision, has caused him to seek relief. His vision at present is R. fingers 3 ft. L. 18/200.

The macroscopic appearance is that of an extensive granular tumor, pinkish in color, raspberry appearance, firmly attached to the corneoscleral margin and lying rather freely upon the eyeball. From its firm attachment at the limbus, it spreads out like a fan beneath the upper and lower lid and extends over the caruncle to the farther point of the inner canthus of the eye. The tumor is attached to a small area of the cornea on the nasal side and spreads out loosely like a flap over the cornea so that only a small section of the pupil and iris are visible on the temporal side. A probe can easily be passed beneath the tumor all around

the cornea and the conjunctiva, except where several large blood vessels appear to pass from the center of the tumor beneath and thru the conjunctiva to the inner angle of the eye. (See plate IX).

The tumor bleeds readily when grasped by the forceps, in this respect resembling granulation tissue. There is no involvement of the eyelids and there are no enlarged lymphatic glands.

MICROSCOPIC EXAMINATION.—On October 9, 1919, a small section of the tumor was excised and given to the Chicago Laboratory for examination; and the following report was made, by Dr. Thomas L. Dagg: "This is a papillomatous structure and does not give sufficient evidence to warrant a diagnosis of malignant change. There is not enough of the subepithelium in the specimen to make a satisfactory examination."

After the operation, sufficient material was obtained for a thoro microscopic examination and I append here the report of the pathologist, Dr. Francis Lane, January 7, 1921.

"The specimen is comprised of epithelia and connective tissue.

EPITHELIUM.—The basal cells are cylindric with deep staining, elongated nuclei and form an unbroken stratum. All stages of differentiation, from stratum germinativum to stratum corneum, are present with an over production of prickle and granular cells. The stratum corneum is reduced to one or two cell layers, evidence of fluid contact.

CONNECTIVE TISSUE.—Loose, vascularized, eosin staining tissue, with areas of small round cell accumulation, characterize true papillae formation. The growth, therefore, consists of a

proliferation of papillae with a corresponding interpapillary indipping of epidermal elements, the basal cells of which constitute an unbroken wall.

DIAGNOSIS.—Papilloma, with mild secondary inflammatory reaction."

OPERATION.—Under cocaine anesthesia and with blunt pointed scissors, the tumor was dissected as close to the cornea as possible. Both the knife and curette were used in an attempt to remove all of the tumor from the cornea, but this was found to be rather deeply imbedded. There was considerable bleeding which was easily checked. The base was cauterized by the actual cautery. The cornea began to clear and the conjunctiva bulbi was entirely free of the tumor.

In about two weeks, however, there was a recurrence of the tumor over the cornea and there were two large blood vessels which were distinctly seen passing from the tumor into the conjunctiva.

The patient was again placed upon the table and the eye cocainized as before. The two large blood vessels were picked up near the limbus and ligated and the tumor cauterized, as before, by the actual cautery.

The blood vessels disappeared and the cornea then became almost perfectly free of the growth. The cautery was used on two other occasions when there was only a faint trace of the tumor remaining on the upper part of the cornea. Patient remained away for several months but recently returned, and I have been obliged twice to cauterize the recurring tumor.

HISTORICAL.—Epibulbar tumors, whether benign or malignant, originating in the cornea proper, are of rare occurrence. Most of the tumors involving the cornea have their origin in the corneoscleral margin or in the conjunctiva and spread until they involve the cornea. According to Greeff,¹ epibulbar tumors begin almost invariably in the corneoscleral margin and very seldom in the central area of

the conjunctiva bulbi. Virchow, referring to the origin of these tumors, speaks of deeply pigmented connective tissue cells appearing in the corneal margin and small black flecks (melanomata) composed of such cells, which are genetic in the formation of new growths. The cause of their development is difficult and at times impossible to ascertain. They may follow slight injury or evolve from scar tissue in the margin of the cornea.

Fuchs,² also, refers to isolated instances of papilloma beginning primarily in the cornea.

Veasey³ has recently reported an interesting case of epibulbar epithelioma, which probably began as a papilloma and later became malignant. This case clearly demonstrated the importance of the complete removal of the tumor and the tendency in some to become malignant.

In the author's case, there has been a marked tendency to recurrence of the tumor in spite of repeated removal and cauterization. A most interesting case, and one which is described as an exact parallel of the author's in that it had the cauliflower, raspberry appearance made of clusters of small papillae, is reported by Coover.⁴ The important point to be considered is that after removal, this growth did not recur for ten years but then returned as a malignant neoplasm, a basal celled epithelioma.

J. Herbert Parsons⁵ refers to a number of cases of epibulbar tumors reported by various writers, and in all these cases the origin was in the limbus.

Stieren⁶ reported a case of epithelioma of papillomatous type similar to that of the author's. After removal of the tumor, the site of the growth was treated by X-ray and there has been no recurrence of the growth. Where frequent recurrence takes place, as in the case herein reported, the question of malignancy must be kept in mind. When last seen the cornea was almost free of the growth.

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ATYPICAL CIRCINATE RETINITIS.

DR. FUMIO YANO.

NAGOYA, JAPAN.

The case here reported from the Aichi University, Japan, was one of a boy of 13 without evidence of general disease.

Retinitis circinata, which was first accurately described by Fuchs in 1893, is a rare form of retinitis, of which not a hundred cases have yet been reported. Having observed lately a case which resembles it, I will report it here.

H. K., 13, boy, farmer, came to the ocular clinic in the Aichi hospital,

Taking a radiogram by X-rays, no change is found, especially in the sella turcica. Accessory nasal cavities are normal. There is no sign of change in the organs of internal secretion by Abderhalden's method. On examining the fundus, almost identical and symmetric changes are noted in each eye;

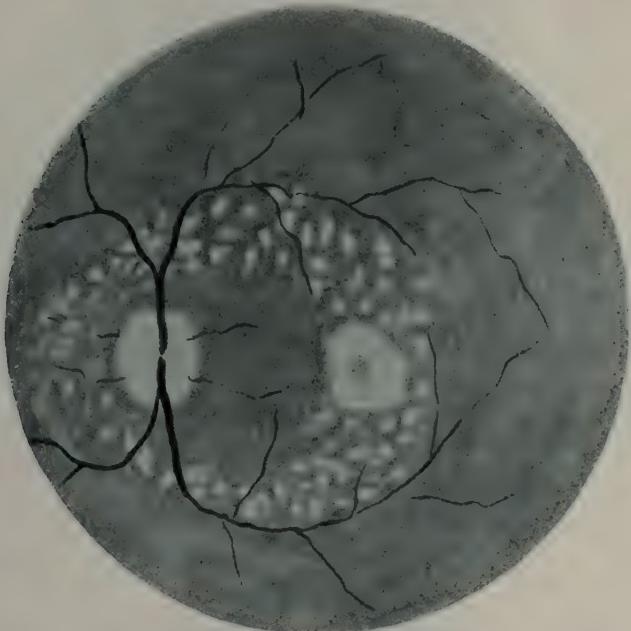


Fig. 2. Circinate retinitis. (Yano's Case.) Fundus of left eye.

March 22 of this year. Born in a home of nonconsanguineous marriage, he has two brothers in good health. On examining the urine, neither albumin, cylinder casts nor sugar were found. Wassermann negative, von Pirquet's reaction negative. No conjunctivitis, keratitis, iritis or cataract are found. The light sense is reduced a little. However, metamorphopsia, night blindness and day blindness are absent. In testing the color sense, red and green are lost entirely, blue and yellow are also remarkably weak. Ring and central scotomata are present in the visual field.

namely, the appearance of a circular or oval zone of white exudation, extending from the macular region to the nasal side of the papilla. This consists of numerous large and small brilliant white flecks or lines, particularly in the central region of the macula (fovea centralis). There is a large white plaque and absence of macular reflex ring; but no other changes except these white spots, especially no hemorrhage or edema in the retina. The retinal vessels pass over the circinate deposits. V., R = 0. L = 0.1, not improved with lens.

Treatment: Internal use of potassium iodid, injection of mercurials, subconjunctival injection of 2% salt solution, and sodium chlorid, for 3 months, have been tried, but without result.

The above case is analogous to retinitis circinata. But circinate retinitis generally attacks old persons. Two-thirds of the cases which have as yet been described, have been in persons

has said, "a central scotoma is usually present in spite of the absence of change in the macular region, on examining the fundus. Altho an ophthalmoscopic change of the macula is absent, there is a superophthalmoscopic one; and it forms step by step a macular patch and seems to represent slight histologic changes.

Sato has divided it into the following kinds: 1. typical in one eye; 2.

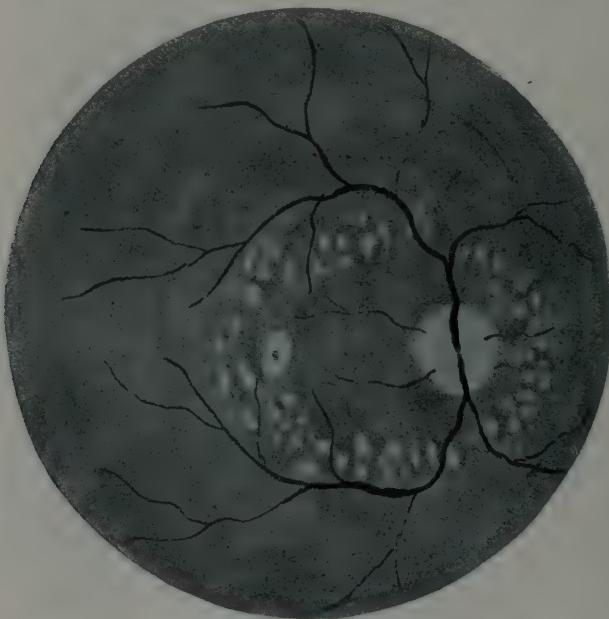


Fig. 2. Circinate retinitis. (Yano's Case.) Fundus of left eye.

of 60 to 70 years. In persons younger than 50, it is seldom seen; but one case was observed in a boy 12 years old. It has been seen more often in women than in men. Retinitis circinata appears mostly in one eye; both eyes are affected in only about a quarter of the cases. In my case it arose in both eyes and was almost symmetric.

Circinate retinitis is especially characterized by the appearance of milk white brilliant flecks on the temporal side of the papilla, around the macular region, and change in the macula itself at the same time. Heinrichy and Harms have distinguished two forms, typical and atypical, from the presence or absence of changes in the macula. Leber

atypical in one eye; 3. typical in both eyes; 4. atypical in both eyes. My case bears resemblance to the fourth; but differs from it in the point of extending the white patch to the nasal side of the papilla. In a case of Fuchs the opaqueness in the macular region projects 3-4 D. into the vitreous humor. Nuel, Strzeminski, Doyne and Stephenson observed detachment of the retina. The blood vessels are usually normal, but sometimes varicosed a little and sclerotic or hemorrhagic. Subjective symptoms, disturbance in vision. But it is reduced so slowly that it is unknown certainly when it began.

The course of retinitis circinata is

eminently chronic and the ophthalmoscopic picture may remain unchanged for years; de Wecker observed no change for 20 years. The etiology of this disease is unknown. Axenfeld, de Wecker and Komoto ascribed it to arterial sclerosis. Some disputants argued that it depended on the histologic change after hemorrhages. But there is no relationship between the proliferation of the white flecks and hemorrhages, as Fuchs and Goldzieher have asserted. Fuchs, Doyne, Steph-

enson and Haab insist that it is the cholesterol crystal formation that makes the white spots. Syphilis may be an etiologic factor (Goldzieher, Lasker), that is, syphilitic disease in the blood vessels may give rise to it. But there was no syphilis in my case. Fuchs, Lasker, Goldzieher and others proved a trace of albuminuria. Sometimes Bright's disease comes to our knowledge after the retinal change but there is no sign of change in the urinary organs in my case.

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CHRONIC CHOROIDITIS WITH LIQUID VITREOUS AND BILATERAL CATARACT; OPERATION; GOOD RESULT.

FRANK ALLPORT, M.D., F.A.C.S.

CHICAGO, ILLINOIS.

The case here reported illustrates the difficulties that may beset cataract extraction. It also indicates the necessary resources for overcoming them and how careful preparedness may secure good results.

The patient was a lady probably over 60 years of age and fleshy. She has been under the care of a prominent and skillful Eastern ophthalmologist for years for recurring choroiditis, iritis, floating opacities, etc. She finally developed liquid vitreous and cataracts in both eyes. In the fall of 1920 her Eastern ophthalmologist performed a preliminary iridectomy in the left eye followed by a good recovery. He later attempted to remove the cataractous lens, but the liquid vitreous escaping in large quantities induced him to close up the eye and await developments and a more favorable opportunity for the lens removal. A violent iridocyclitis followed and, being obliged to return to her home in Chicago, she consulted me.

She was then suffering from an intense iridocyclitis and I found the lens dislocated downwards and partly in the anterior chamber. As a matter of fact it was directly in the pupil and resting upon the lower pupillary margin. I advised immediate removal of the lens and sent her to St. Luke's Hospital. I did not dare to operate upon her in the operating room for fear of a disastrous loss of vitreous humor in transporting her from the operating table to her bed. I, therefore, put an extra mattress on the bed and operated with her head to the low footboard. I was prepared for all emergencies. I used Fisher's retractors instead of a speculum, which, altho awkward to operate around, are much safer than a speculum when loss of vitreous is considered.

I made my incision with a Graefe cataract knife and the eyeball immediately began to collapse, sinking lower and lower. The lens also immediately began to drop into the vitreous chamber. I quickly grasped my delivery loop but before I could get it into the

eye the lens had disappeared from view. My first sweep of the loop produced nothing but an empty loop, but my second was more fortunate. The lens was in the loop and was quickly delivered. The eye was filled with a warm, sterile, normal salt solution and the eye quickly closed with a light bandage.

The patient lay where she was operated upon and most admirably assisted me in every possible manner. She was kept quiet and free from sleeplessness by hypodermic injections of codein; no bowel movement was encouraged or occurred. The bandage was not removed for six days. The eye looked very well and was healed and of a normal degree of rotundity. Atropin was used and a mild bichlorid ointment; the bandage was reapplied and was not removed for three days. From then on the case presented no novelties. She made a good recovery.

In February, 1921, I sent her back to the hospital to make a preliminary iridectomy upon the right eye. This operation was performed with the same precaution as the other on account of the liquid vitreous; that is, she was operated in her bed, etc. The operation was successful and she made an uneventful recovery.

March 29 I sent her back to the hospital for the removal of the lens and in view of the preceding experiences, this operation was performed with extreme anxiety. I operated her on the bed as usual, used Fisher's retractors, and made my incision with Graefe's knife. The eye immediately began to slowly collapse; not rapidly like the other one but slowly. The lens also began to slowly sink. I lacerated the anterior capsule, hoping to get the lens out by gentle persuasion, but the first pressure upon the eyeball

with the spoon showed me that this method was hopeless. I, therefore, passed my wire loop underneath the lens, which by this time was almost out of sight, and pulled it into the incision. The incision, however, proved to be too small for the lens and loop together. I, therefore, pinioned the lens, which was partly delivered, with a needle and then gently pulled out the loop. This was followed by the delivery of the lens on the needle.

I filled the eye with warm, sterile, normal salt solution, squeezed into the culdesac some atropin and bichlorid ointment, and quickly closed the eye. She lay where she was operated as before for six days, being quieted by codein injections. She had no bowel movements.

When I looked at her eye at the end of six days I found a great deal of redness and reaction and the dilated pupil completely filled with a white curtain. Whether this was a detached retina or a panophthalmitis or a mass of capsule I could not tell at that time, as the dressing was slight and hurried. Whatever it was, however, it looked bad enough and very discouraging. Subsequent dressings revealed the fact that it was capsule but how it came there is a mystery, because I supposed I removed the lens in its capsule with the loop. But it must be remembered that I lacerated the anterior capsule and I presume either at the time I introduced the loop or when I transfixed the lens with the needle the lens itself shelled out of its encasement, leaving an enormous capsule behind, most menacing in its character. A prolonged and stubborn iritis followed this operation but after a while black pu-

pillary spaces were seen here and there increasing in size as time progressed and finally the whole membrane absorbed or, at least, practically absorbed leaving a fine black pupil.

The ultimate result in this case in each eye is a full, round, white, unirritated eye on both sides with clear black pupils, and vision with glasses in each eye, 20/40, Jaeger No. 2.

This lady now is practically unhandicapped so far as her eyes are concerned. She reads, writes, attends functions, goes down town shopping, etc. I desire to say that, before operation she was not only blind, but deaf as well; deaf to such an extent that she could only carry on conversation by means of an electric acousicon.

The chief reasons for success in this case, where disaster certainly stared us in the face, were:

1st: The extremely good conduct of the patient under any and all circumstances.

2nd: Operating on the bed instead of the operating table.

3rd: The use of retractors instead of a speculum.

4th: The prompt use of a wire loop.

5th: The immediate injection of warm, sterile, normal salt solution.

6th: The extreme quietude of the patient for the first few days after the operations, produced not only by her own character but by codein hypodermics.

If any reader knows of a similar case of double choroiditis, watery vitreous, removal of cataracts, and successful results, I would like to be informed as I am anxious to gather material on the subject.

KERATITIS CAUSED BY EXCESSIVE SUGAR INGESTION.

A. C. MACLEISH, A.B., M.D.

LOS ANGELES, CALIFORNIA.

The benefit of abstinence from sugar in phlyctenular keratitis is well known. But in the case here reported the corneal parenchyma was the seat of inflammation and no phylctenules or ulcers were present.

Diseases of the same portion of any organ have more or less the same general characteristics, no matter what may be the causative agent. It is because of this, and because there are so many causative agents, that diseases progress despite treatment; when had the real cause been found, the progress would have been checked, and the disease cured. However, I think we are often too prone to search for some obscure cause, when the actual is really much more simple to discover. On the other hand, we must not neglect any investigation necessary to eliminate a reasonable doubt, when there is a question as to the cause of a condition.

Functional disturbances of the eye due to disorders of the intestinal tract are constantly being met with, and in such varied forms, that there seems to be no limit to their variety. These disturbances may be seen as active inflammations or as temporary derangements of the innervation of various portions of the organ. In some cases, the latter may assume the proportions of actual pareses of one or more of the ocular nerves.

Among the active inflammations of the eye from this source may be mentioned: conjunctivitis, blepharitis, episcleritis, scleritis, uveitis (especially anterior uveitis), keratitis, choroiditis, retinitis, and optic neuritis. These may be found singly or in combination. In this connection, it may be mentioned that there is much evidence that glaucoma, especially in its chronic form, may be directly due to the absorption of toxins from an inactive lower bowel, the action of these toxins causing an alteration in the structure of the blood vessel walls, and thus interfering with osmosis in the terminal portions.

Among the disturbances of innervation we find: scotomata (central),

either actual or relative, especially enlargement of the blind spot; retinal hyperesthesia; accommodative failure; paresis of the pupillary fibres of the third nerve, which may be unilateral, causing anisocoria, or bilateral, either of which may be accompanied by ptosis; and paresis of the sixth nerve resulting in convergent strabismus.

These conditions may be caused by the absorption of small amounts of toxins over a prolonged period of time, or by the absorption of a large amount of toxins suddenly thrown into the system. The more chronic forms are caused by the former, and the acuter forms by the latter. The toxins are probably carried directly in the blood stream.

The overingestion of certain kinds of food, especially in the young, is apt to cause general systemic and also local derangements. Chief among these foods is sugar. It seems that in the young the system is particularly intolerant of an excess of sugar and resents it in many different ways.

We frequently see conjunctivitis, blepharitis, phlyctenules and facial eruptions, due to the overindulgence in sweets by children, and have found these to clear up entirely when the cause was removed, while using only the simplest of remedies locally, such as boric acid solution and heat. Recently, however, there has come to our notice a case which has been unique, and regarding which we can find no mention in the available literature. For these reasons we have thought it worthy of publication.

On March 10, 1920, Mary M., age 3, white, was brought for examination with the following history: Both eyes had been in poor condition for the year previous. There had been recurrent attacks of inflammation accompanied by pain, photophobia and lacrimation.

The eyes had been under almost constant care by different oculists but without lasting or definite benefit. The treatment had consisted of boric acid flushings, argyrol, yellow oxid of mercury ointment, atropin, and various internal medications, including specific treatment for lues. The mother said that a Wassermann test had been made which was negative. The patient was decidedly not well physically, and was very nervous.

Physical examination showed an undernourished, almost emaciated child. The complexion was pallid and unhealthy, and a blotchy, macular eruption showed on the face. The dentition was poor. The child was constantly rubbing her frontal hair, which was worn down to a short stubble. The body was thin with the ribs showing plainly; the arms and legs were very thin, but the abdomen was large, tense, and prominent. The picture presented was typically one of malnutrition. The mother stated that there was a more or less constantly alternating constipation and diarrhea, and that the child's appetite was poor and erratic.

The examination of the eyes was accomplished with considerable difficulty on account of the extreme photophobia and lacrimation, which made it almost impossible to separate the lids. However, by perseverance, both corneae were seen and both showed a diffuse, blotchy, but distinct interstitial keratitis, with some roughening of the superficial epithelium. In some places in each eye, the clouding of the cornea seemed to be deeper than in others, but in neither was the involvement very deep altho decidedly interstitial in character. The pupils and irides could not be seen. There was a moderate amount of ocular congestion, some conjunctivitis and blepharitis; but the palpebral conjunctiva was not rough. No ulcerations or phlyctenules showed.

The physical condition and the condition of the eyes pointed to a luetic infection, but there were none of the characteristic lines about the mouth, and the teeth, altho in a bad state, were

not notched. Besides, the history of a negative Wassermann, and the fact that the child had been under antisiphilitic treatment without benefit, led us to suspect that there was some other cause.

On questioning the mother it was ascertained that the child was inordinately fond of sweets, and ate a large quantity of sugar daily.

Atropin $\frac{1}{2}\%$, one drop in each eye thrice daily, was ordered, and the patient was referred to Dr. V. E. Stork for further examination and treatment.

Dr. Stork confirmed the diagnosis of malnutrition, and reported that a Wassermann test was negative. He discovered that the child was allowed to eat sugar almost at will, and that she was accustomed to eat it even on green vegetables! Besides this, she was allowed a bag of "jelly-beans" daily! There was no glycosuria, altho it might have been expected.

A strict diet was ordered with the elimination of all sugar, and the mother instructed to continue the hot compresses and atropin.

On March 24, two weeks later, the patient was seen again and showed an almost unbelievable improvement, looking and acting like a different child. The eyes were well open, and there was almost no photophobia or lacrimation. The corneae were much clearer, the pupils were well dilated, and the blepharitis was almost gone. She did not rub her head and the rash on her face was much better. The bowel condition was also much better. In the words of the mother, "A new baby!"

Ung. Hg. Oxid. Flav. 1% was ordered to be used with light massage at night. Atropin was to be stopped. Boric acid flushing and hot compresses to be used thrice daily.

On April 20, one month later, the improvement was still more marked. There was no eruption on the face; the frontal hair had grown out well; the abdomen was soft and much less prominent, and there had been a marked increase in weight. There was no conjunctivitis, blepharitis, photophobia or lacrimation, and the corneal scars were small and fortu-

nately subcentral. Ophthalmoscopic examination showed no lesion of the fundus. Ung. flav. was ordered to be continued every third night with massage for several months. No other medication was to be used locally.

The child was not seen again; but several months after, her mother reported that she was strong and healthy, saw well, and had had no further trouble.

In March of this year (1921) we were informed that there had been a recurrence. It seems that the mother had been ill and confined to a hospital for some time, and that during this time the child had been living with a

friend of the family. Not being under the watchful eye of her mother, she had been again eating too much sugar and the same condition had returned in a milder form. Under appropriate diet and the withdrawal of the sugar, the condition has cleared up again. It is reasonable to suppose that there will be subsequent recurrences if sugar is overindulged in; but whether this susceptibility will continue throughout life, or whether it will gradually die out is impossible to foretell.

The point of interest in this case is the rapidity of improvement shown after the withdrawal of the cause of the trouble, when only the simplest of remedies were used locally.

REPEATED OPERATIONS FOR GLAUCOMA. REPORT OF A CASE.

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The case here reported illustrates the possibility of holding glaucoma in check by repeated operations. The Lagrange operation, extraction of cataract, trephining and excision of a membrane that closed the trephine opening were resorted to in succession; each with benefit and temporary restoration of vision. Read before the American Ophthalmological Society, June 1921.

The subject of my paper is one that has been much discussed; but as our results from the operation for simple glaucoma are still unsuccessful in many cases, consideration of the causes of these failures seems not out of place. The case, which I shall report, has been interesting to me in that it illustrates many of the difficulties we may encounter, and the necessity of watching the cases carefully for a long period of time.

FAMILY HISTORY. My patient's mother went blind at the age of seventy-one years from glaucoma, three years before her death. Her eyes were operated upon, but it was said to have been too late to prevent blindness. One sister had an operation for glaucoma when forty-nine years of age, which preserved the sight of one eye for about six years, but she eventually became blind. Another sister had glaucoma when fifty-two years old, and in 1896 when she came under my care, had lost the sight in one eye, and the vision in the other eye was 20/120. I did a simple iridectomy, using a broad keratome, which relieved the tension so that her vision was improved to 20/40. This vision had been retained with normal tension when I saw her last in 1913—seventeen years. I have recently heard that her vision remains the same. The fields, which had narrowed considerably before operation, improved somewhat upon the restoration of normal tension, and were retained. The blind eye, on which she refused to have an operation, became so severely painful that she returned in 1913 to have it removed.

CASE. Mrs. H., aged 59 years, consulted me first 1912. She had noticed failure of vision in her right eye the past three years and for one year had

been having electric treatments, probably high frequency current, with no improvement. The vision of her left eye had also begun to fail, and as her physician said the trouble was not glaucoma and that he could promise nothing from the electric treatments, she decided to consult some one else. Her vision equalled fingers at two feet with the right eye and 6/12 in the left. The left could be improved by +0.75 Sph. to 6/7.5. There was no congestion in either eye, the media were clear; but the optic discs were deeply cupped, the right more than the left, and were pale, with narrowing of the retinal vessels. The right field was nearly normal in outline for white, but had a large crescentic scotoma below, involving the fixation point. The left field was normal in extent with an abnormally large blind spot. The tension was 60 mm. in right eye and 40 mm. in the left. After the use of the miotic, the tension five days later was 40 mm. right and 30 mm. left.

As I advised consultation before operating, she consulted Dr. Wilder, and we decided the best procedure would be to do the Lagrange operation, as our experience at that time with the Elliot operation had not been favorable enough to depend upon it. I did a Lagrange operation on both eyes under general anesthesia, removing a large sector of iris and a good sized piece of the sclera and covering the wounds well with a conjunctival flap. The conjunctival flap healed readily, but the scleral wound did not close completely for some time, the aqueous escaping under the conjunctiva. Massage was used daily. At the end of a month the tension was normal in both eyes, the wounds were closed with the conjunctival bleb

showing; and the vision was somewhat better than before operation. Five months after operation, the tension was 18 mm. in the right eye and 24 mm. in the left. The tension continued the same until nine months after operation, when I found it to be 24 mm. in the right and 40 mm. in the left. As the large iridectomy prevented a trephining above, I did it below with a two mm. trephine, removing a peripheral piece of iris.

Healing took place readily with a large bleb. Two months later the tension was 22 mm. and three months after operation the tension was only 10 mm.; her vision with correction was 6/10—, and the large bleb over the trephine opening remained. The vision continued until April, 1914, seven months after the second operation, when I found her vision reduced to 6/15— and a small opacity at the posterior part of the lens. The vitreous was clear and no changes could be seen in the fundus except the cupping of the optic disc. Two months later her vision had become reduced to 6/60, and there was diffuse opacity of the lens. There was no central scotoma. Dr. Wilder saw her again and was of the opinion that the opacity of the lens was the only cause of the poor vision, as the tension was as low as five mm. at this time. A little later, a mild form of inflammation began in the eye, and upon the use of mydriatics, some adhesions of the iris to the lens were found. Whether these were caused by the low tension or were part of a low-grade iridocyclitis producing the low tension, I could not determine. It quieted down under treatment and the tension improved slightly.

In October, 1915, the opacity of the lens having become almost complete, I operated for removal of cataract. The lens was very sticky and difficult to remove, but after needling the capsule a month later, her vision was 6/10 with a corrected glass. She returned in May, 1916, complaining of pain in the eye, and I found the tension was 28 mm. By the use of pilocarpin solution, the tension was kept down fair-

ly well until June, 1917, when it went up to 40 mm., and I decided it was best to operate again. I did another trephining below, near the former trephine site, which gave good drainage, so that the vision returned to 6/10 with the correcting glass, and the tension was normal. This condition continued until Oct., 1918.

As she lived some distance away, I did not see her again until August 1920, when she returned, complaining of failing vision. I found her sight reduced to 6/60, and there was a small scotoma involving the fixation point. The tension varied from 27 mm. to 33 mm., being reduced somewhat by the use of miotics. There was great thickening of the bulbar conjunctiva below, but it was solid and did not show the pitting which was present when she passed from under my observation in 1918. Examination showed that she had some diseased teeth, and these were removed, but no improvement in the eye condition followed. In January of this year, the tension had risen to 35 mm., and in February I operated again. I dissected up a large conjunctival flap below and found it to be very thick and fibrous for a long distance from the trephine opening; and directly over the trephine opening I found a dense glistening membrane grown fast to the sclera, preventing drainage. This I dissected away, also considerable of the hyperplastic tissue, giving good drainage, so the tension was once more reduced to normal (22 mm.), with vision of 6/60 with her glasses. There is a good-sized bleb present and the condition seems exactly as after the first trephining, except for the thickened conjunctiva.

The history of several cases of glaucoma in a family, during two or more generations, has been frequently reported. In 1908, Lawford¹ of London collected the histories of twenty-four families, including one reported by Dr. Howe². Dr. Calhoun³ also reported several cases in a family during three generations. In most of the families, the onset of the glaucoma is at a

younger age in each succeeding generation.

In the family of my patient, the age of the mother was seventy-one years and the daughters forty-nine, fifty-two and fifty-six years, when they were attacked. I have been unable to determine any cause for this predisposition. The two sisters, who came under my care, were seemingly in good health, with blood pressure normal or slightly below. The refraction of one was slightly myopic and the other slightly hyperopic, with no deviation from the normal in the size of the corneas.

As to response to treatment, Netleship⁴ remarks that in some families the prognosis is bad, while in other families there does not seem to be any difference from the ordinary cases. In the family whose history I have given, the only eye which retained good vision was the one in which I did a simple iridectomy at a time before sclerostomy came into use. I have recently been consulted by a physician with simple glaucoma of both eyes. He explained his reluctance to have an operation, as I advised, by giving the history of blindness in father, uncle and three brothers, in spite of their having had operations by good surgeons in different parts of the country.

My experience with the first few cases of trephining was not so favorable as to make it the operation of choice. I could find no reason, in the case I am reporting, why the Lagrange operation, done as nearly alike as possible in the two eyes, should have been so successful in the poorer eye which has retained normal tension ever since, and have proven so unsatisfactory in the other eye, necessitating another operation at the end of nine months. I used massage to facilitate drainage during the period of healing, and a filtering scar was present in both eyes for some time, when the bleb disappeared, as is usually the case.

When a second operation became necessary the only choice left, on account of the broad iridectomy, was to make it below or to one side of the coloboma, where the bleb would be exposed when the eye was open.

I decided to make it below, although I think the danger of secondary infection is much greater at this point than under the upper lid. The constant irritation of the lower lid undoubtedly produced the great thickening of the subconjunctival tissue, and in this way probably caused a blocking at the opening, with return of tension. This hypertrophy of the subconjunctival tissue, producing closure of the scleral opening, is reported by a number of operators with no explanation given for its occurrence. In a large number of trephinings which I have done with the flap under the upper lid, I have never had this occur, and considered it due to the location. In the cases reported, however, this does not explain the condition. It is worthy of note that in animal experimentation, the hyperplasia of tissue causes a closure of the opening in nearly every case.

Why there should have been hypotony after the second operation, following a period of normal tension, I could not determine. It is possible that there was good drainage with a diminished secretion of fluid in the eye, as a result of the previous tension. That there was a close relation of the hypotony to the development of the cataract, I have no doubt. With the lack of normal tone in the eye, it seems reasonable to suppose that the lens, which depends on absorption of the fluid surrounding it for its nutrition, should not be sufficiently nourished.

E. Treachor Collins⁵, in his paper on Sequellae of Hypotony, stated that he had watched cases of minus tension following sclerocorneal trephining for years in which apparently there had been no ill effects. Elliot, in his discussion of the paper, said that the prevalent idea that opacity of the lens would follow hypotony was due to the experience with cases due to decreased ciliary secretion. That hypotony, due to operation, had never been followed by this result in his experience, and he had followed cases as long as six years in which there had been no changes in the lens or diminution of the vision.

Knapp⁶ does not consider the continued low tension as harmless. He reported six eyes in four patients with tension varying from two to ten mm. at a period of four to five years after trephining. One was lost with phthisis bulbi and in two the lenses became opaque.

Considering the marked changes to be found in the other structures of the eye, it would be strange if the lens escaped.

It is interesting to note that in my last operation on this patient, the blocking of the trephine opening was caused by a dense membrane covering the opening. Verhoeff,⁷ in his histologic examination of an eye in which a successful sclerostomy had been performed mentioned the fine reticulated tissue, which had grown down into the scleral opening; but in my case, as far as

macroscopic examination could determine, there was none present. The removal of the membrane has restored the drainage, the permanency of which it is too soon to determine. I removed part of the hypertrophied subconjunctival tissue, and should have removed more of it except for the fear of secondary infection. I can find no report of cases in which this has been done, but I could see no reason for making a new opening when a former one was patent and sufficient to give the necessary drainage.

A recent report of her condition from Dr. Edgar of Dixon, Ill., under whose observation she has been since the operation, says the tension of the eye was 13 mm. in April, and has remained about the same with a rather prominent bleb always present, and there has been no change in vision.

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THREE CASES OF WORD BLINDNESS.

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Of these cases one was of acquired disability associated with advancing paralysis and some mind blindness. The other two were of the congenital form recognized in boys ten years of age. Read before the American Ophthalmological Society, June, 1921.

The subject of this paper may seem out of place in an ophthalmologic program, since it belongs in the indefinite borderland between ophthalmology, neurology and psychology. The patients I have seen, however, all consulted an ophthalmologist first, either directly or at the instance of their physicians, because the trouble was thought to be an ocular and not a cerebral defect. I do not suppose the condition can be such a rare one, but it is probably very frequently overlooked or masked by more obtrusive symptoms. Indeed both my congenital cases had passed thru the hands of several ophthalmologists without recognition. This is the more important because the whole future of such children depends on early recognition.

Acquired word blindness was first noticed by Kussmaul,¹ some fifty years ago and the congenital type a few years later. Indeed, the latter could hardly have been suspected or diagnosed without a previous knowledge of the former, and for that reason I have included them both in this paper.

The term "word blindness" has been severely criticised as unscientific, and various substitutes offered;²⁻⁸ but it now seems so firmly engrafted in our terminology that criticism is probably superfluous. It implies that a person, who can see perfectly, recognize objects and numbers, write correctly and perform calculations, has suddenly become unable to recognize letters or words with which he was previously perfectly familiar, perhaps not even his own name. And yet their meaning is grasped instantly when they are spelled or spoken aloud.

Thomas L., a Greek, 59 years of age, living in a small town, while apparently in robust health, had an attack of dizziness on going to bed one evening and the next morning was found to have a slight paralysis of the right side,

some diplopia and some defect of vision, which prevented his reading print of no matter what size. The paralysis was apparently an evanescent one, for he was confined to the house only a few days. The nature of the seizure was at once suspected, a strongly positive Wassermann found and under very active treatment, his physical condition improved rapidly. He seemed about as well as usual except that for a time he was unable to find his way about the small town in which he lived because he did not recognize familiar buildings and landmarks; and as he was still absolutely unable to read his paper, he was, a few weeks later in May, 1919, referred to me for an examination of his eyes. By that time he walked perfectly well, his diplopia had disappeared, he had begun to find his way about town again and that morning was able to recognize the railway stations on his way to New York which he had previously been unable to do.

So far as his eyes were concerned, the media were clear, the fundi normal, the pupils normal except that the right was slightly larger and slower in its light reaction than the left. The red glass test showed some weakness of the left external rectus but there was no longer any spontaneous diplopia. He apparently had very much reduced central vision because he could read no letters on the test chart at all, tho he was said to be familiar with English. To my great surprise, when I turned his attention to a chart with numbers, his vision was normal in each eye and with presbyopic correction he read the numerical equivalent of number one Jäeger, without hesitation.

Of the headlines of a Greek paper, however, he could not read a word. Tho he could not recognize words or letters either in English or Greek,

he was able to write them readily, but when shown to him a few moments later they meant nothing to him, not even his own name. I noticed that if he watched me write a word he could recognize it if it was a short one, tho only for an instant, and then discovered that if allowed to trace a letter or a short word with pencil or match he could generally recognize it. He recognized objects and their uses readily but occasionally hesitated over their names, to his great vexation. Numbers he recognized normally and was able to perform correctly various calculations.

He was found to have a right homonymous hemianopsia, quite sharply marked and not involving the fixation point in either eye. This hemianopsia was a curious one because, while it seemed complete under the usual tests, he claimed at times to see hand movements if quickly made in the blind field and did not fall over things or collide with people as much as one would expect.

I saw him again a month later when his condition had improved materially. He could now recognize Greek letters and words fairly well and was able to read a little Greek text, which he could not do before, and could recognize his own name. The hemianopsia was unchanged.

In spite of several efforts I have not been able to secure another examination. His family physician tells me that he got perfectly well, of which I am very skeptical. It is of course possible that most of his symptoms were "distant" ones.

Every normal individual has the power of storing up and reproducing, more or less at will, the impressions received thru the various senses. This constitutes memory.

For instance, an eye may react to light and show a perfectly clear retinal image; but if the connection between it and the primary visual areas about the calcarine fissures are destroyed or blocked, the individual is not conscious that he sees. And unless he can compare what he sees at one instant with previous impressions,

every visual impression would be absolutely new and valueless from the point of view of recognition or as a basis for judgment. These visual memories seem to be stored in the cortex about the angular gyrus; in right handed people, on the left side. Each one of the senses seems to have a similar memory centre⁴ in the same general neighborhood and these various centres seem to be connected in very intimate fashion. What little we know about the subject, comes from the careful study and comparison of clinical cases and occasional autopsy; and our information is extremely indefinite. In many cases, as in the one reported the visual memory area is blocked but not destroyed and the patient is able to get at it in some round about way thru its connector with the auditory or tactile memories so that when he hears the object named or can touch or taste or smell it, he at once remembers how it looked; for instance, he can write, tho he cannot afterwards read what he has written. But if the area be destroyed or completely isolated, visual memories cannot be revived thru the other senses; and the so called "mind blindness"⁵ results, in which the patient has not the faintest idea what he is seeing. He has no visual memory to project and therefore cannot write.

Apparently this visual memory area is still further divided or specialized. Less complete destruction or blocking has resulted in recorded cases of word blindness without letter blindness,⁶ of letter without word blindness,⁷ of musical note blindness,⁸ of blindness for one language like French while ability to read another with similar characters like English was preserved, of inability to read English while Greek or Arabic were retained,⁹ and of psychic color blindness¹⁰. In almost all these cases a right hemianopsia was present. This of itself would not cause any interference with the visual memory so long as the connection between the memory centre and the opposite hemisphere was preserved. If this was interrupted some form of memory blindness would occur. This is the usual type, the most common lesion being some vas-

cular changes in the sylvian artery or its branches, which supplies the whole region of the angular gyrus and the communicating paths leading to it. It is quite likely that in a good many hemiopic patients, word blindness is overlooked, the inability to read being interpreted as the result of very poor central vision. There is no apparent reason why word or letter blindness should be any more common than number, note, or object blindness, tho they would be less often detected by routine tests.

The prognosis must of necessity depend on the amount of actual destruction as compared to the amount of temporary pressure, edema or anemia; but hemianopsia notoriously is not likely to disappear. Younger and more intelligent patients can learn to read by developing roundabout methods of communication thru other centres, such as by actually or mentally tracing a letter or word and saying it aloud. Hinshelwood records one case where a patient by enormous effort reacquired the ability to read haltingly, the autopsy showing a very unusual development of the corresponding region in the other hemisphere⁹. This would naturally be easier in the young and almost impossible in the old.

Congenital word blindness implies a congenital defect which prevents an otherwise normal child from learning to read, either entirely or after very great difficulty. It could hardly have been identified clinically without the suggestion derived from knowledge of acquired cases.

At first considered a very rare condition, the pendulum has now swung so far in the other direction that the term is twisted to include all sorts of cases, whether due to organic defect or poor teaching or general stupidity. The following cases perhaps will serve to outline the clinical picture.

Master B. ten years of age, a child of normal, healthy, intellectual parents married late in life, was born when his mother was thirty-five years of age, after a labor said to have lasted five days and terminated by forceps. He was always delicate and sickly, but

survived a double pneumonia. As a small child, he complained of seeing things upside down, was sent to school at the age of six, was able to learn the letters of the alphabet with the greatest difficulty and was never able to distinguish "M" from "W". He had never been able to read or spell, stumbling over the shortest words. He keenly enjoyed having stories read to him but would not make the slightest effort to read for himself. He could not write words readily but recognized them at once when read to him or spelled aloud, but he conversed unusually well for his age and was said to be exceedingly clever in mathematics. His poor progress in school had been a great trial to his parents. He had been taken to several ophthalmologists in the hope that the trouble was due to some defect in the eyes. He had worn glasses from time to time.

Both parents had finally come to regard him as a mental defective; and the father, who had looked forward to seeing his own classical career repeated in his son, could hardly bear the sight of him, while the child had the attitude of a whipped dog and had entirely lost his intellectual morale. Careful examination of his eyes showed them to be absolutely normal except for a low refractive error. There was no hemianopsia.

The probable nature of the trouble was explained to the parents and particularly to the boy himself, with the suggestion that with individual teaching and great patience he would eventually learn to read fairly but probably never normally and that he should be educated along the lines of strength rather than of weakness.

I have seen this boy occasionally during ten years. He now reads fairly well but laboriously and not for pleasure. He has never been able to do much with languages but has been an exceptionally good mathematician and is acquitted himself very creditably, being nearly ready to enter the Boston School of Technology. Even today he has to spell long and unfamiliar words aloud to assist himself in reading.

J. G., age ten, was brought to me because he could not learn to read and was very backward in school, in the hope that there might be some ocular condition which would account for the trouble. His parents were unusually intelligent, educated people and his younger brothers had completely outstripped him so that he is considered by the other children, his parents and himself as more or less of a fool. He hated to go to school and was too discouraged to try very hard at anything.

He was a bright enough boy, when talked to about things that interested him. He could not read common words like dog and cat well, but recognized them at once when spoken to him or when he was made to spell them aloud for himself. He took a keen joy in the funny supplement and after looking at the picture could stumble thru the captions which he could not previously read; did mental arithmetic better than normal. Naturally left handed, he had been made to use his right, but was not definitely right or left handed, writing his name with either hand, but if he wrote right handed first, did not afterward use his left so freely unless allowed to write backward, which he did much better than forward with this hand.

In this case, too, the eyes were normal in every way except for a low refractive error, and there was no hemianopsia.

Explanation of the difficulty made an entire change in the attitude of parents and brothers toward him and did even more to restore his own morale, while individual teaching along better psychologic lines resulted in rather remarkable scholastic progress.

There are very wide variations, within psychologic limits, of the ability of children to store up visual memories. There are occasional instances which are almost beyond belief. Binet instances a man who could take in at a glance whole columns of figures and afterward reproduce them at will in his own mind just as tho he were looking at a photograph.¹¹ Gould has reported a patient who could take in a large part of a page at a glance.¹² Theodore

Roosevelt was supposed to have had this faculty to an unusual degree. On the other hand there are whole groups of children whose perceptions are distinctly auditory rather than visual; and it is only when word perception is far below the ordinary physiologic limits that we are justified in classing a child with the congenital word blind. It is said to occur much more often in boys than girls.

Most of us learned our letters individually from blocks or large type, hearing the letters called and calling them ourselves, and so associating the auditory and visual centres. Short words followed, being spelled aloud so that any child with a visual memory, competent to embrace the letters of the alphabet, could with patience learn to read a passable amount thru the auditory association, even tho the visual memory centre was not very good. With practice we learned to recognize words as entities and not as collections of phonetic letters and in this way alone could we read as the educated man must read. But the modern educational method tends to skip the first two stages, the child no longer learns letters and instead of his visual memory centre having to become familiar with a half a hundred forms, it is compelled to assimilate the infinite number of combinations of letters first in syllabes, finally in whole words, and all this with very little aid from the auditory memory centre. Under the modern system, it would seem as tho the number of cases of congenital word blindness ought to be much greater and the teaching them a modicum of reading much more difficult.

From clinical cases of acquired word blindness, it would seem that letters, numbers, musical notes, words etc., occupy perhaps closely contiguous but nevertheless distinct areas in the visual memory centre which may be destroyed, but are more often perhaps simply isolated by various subcortical lesions.

In the congenital cases, however, it is much more likely that the defects are cortical and due to lack of development rather than to destructive lesions. For

this reason, they are not so likely to be extreme defects (and being limited to the neighborhood of the angular gyri, are not accompanied by hemianopsia as in the acquired type). We might expect to find the same variety of clinical types from what has been called congenital "dyslexia,"¹³ a very rapid fatigue of the centre up to absolute letter blindness.

In youth, too, if one side of the brain is crippled, there is some chance that the other side may take up its normal function successfully, a thing which can hardly be hoped for in the elderly, altho attempts at it have been indicated.

The fact of right or left handedness is interesting too. Feeble-mindedness is said to be much more frequent in left than right handed children. The right handed always have the visual memory center, on the left angular gyrus and vice versa. Indeed some claim that the manual center determines its localization. It is quite conceivable that the attempts to change a naturally left handed boy into a right might have prevented the specialization of one definite visual center as it did the writing one.¹⁴

Methods of treatment. It is important to explain matters carefully to parents and perhaps to the child in order to remove the stigma of inferiority which affects adversely the whole morale of childhood. Individual instruction and an understanding teacher are indispensable. It would probably be a mistake to teach the child to substitute auditory and tactile for visual memories entirely, but they can certainly be used to facilitate the storing of those memories. The use of block letters, of spelling aloud and reading aloud, will be of great assistance. The prognosis must be a rather uncertain one, but most of these children in time learn to read more or less. There is a possibility in childhood that the corresponding area on the right side of the brain might take up the function of the defective left. Hinshelwood records an adult case where autopsy revealed an attempt at this as shown by an unusual development of the area, and of course this would be done much more readily in childhood. The choice of occupation or profession, in which success should depend as little as possible on visual memories, would also be most important.

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OCULAR CHANGES IN INFANTILE SCURVY.

EUGENE M. BLAKE, M.D.

NEW HAVEN, CONN.

The general occurrence and characteristics of infantile scurvy are here discussed. A case is reported illustrating the difficulty of its diagnosis and also the very rapid improvement with proper diet. Read before the American Ophthalmological Society, June, 1921.

The infrequency of scorbutus in infants and the scanty literature concerning the ocular changes in this condition, make the recording of an additional case seem worth while. Since the ophthalmologist may be consulted before the diagnosis of scurvy has been made, it is well for us to be cognizant of the changes which that disease may bring about in the ocular structures.

Infantile scurvy may be defined as a constitutional disease due to some prolonged error in diet. It is frequently referred to as Barlow's Disease because of the clear demonstration of its clinical and pathologic features described by Sir Thomas Barlow in 1883. The disease is characterized by spongy, bleeding gums, swellings and ecchymoses about joints, especially the knee and ankle, hemorrhages from the nose and other mucous membranes, extreme hyperesthesia and often pseudoparalysis of the lower extremities. There is usually a marked general cachexia and anemia.

Age is an important factor, four-fifths of the cases occurring between the sixth and fifteenth months, and one-half between the seventh and tenth months. Previous disease does not appear to be a factor of importance, altho derangements of the digestive tract may predispose in certain cases. The only etiologic element known to be constant in the production of scurvy, is diet, no specific scorbutic poison being present, but rather an absence of some antiscorbutic element from the food. The cases occur most commonly in infants fed on proprietary foods, on condensed milk or milk which has been too thoroly boiled. Generally several months elapse before such improper feeding produces the signs of scurvy.

Usually the first symptom observed is tenderness of the legs when handling

the affected infant. Associated with this hyperesthesia is fretfulness, pallor and failing nutrition. The soreness of the legs increases and swellings appear about the joints. Coincidently with this, the gums become purplish and swollen and bleed easily, and there is loss of color, weight and appetite. Unless proper treatment is instituted, these symptoms increase and paralysis of the extremities may be simulated, due chiefly to the pain incident to movement of the part. Traumatism may be suspected because of the appearance of ecchymoses in the skin.

The pathologic lesions are most marked in the bones, bloodvessels and the blood, and the most striking feature is subperiosteal hemorrhage, which may be very extensive. Extravasations may be found between the muscles and beneath the pleura, peritoneum and pericardium. A rarefying osteitis may be present, and separation of the epiphyses from the shaft of some of the long bones is generally found in fatal cases.

Probably the most frequent and certainly the most striking ocular complication of infantile scurvy is exophthalmos due to hemorrhage into the orbit. In 1898 the American Pediatric Society conducted a collective investigation of infantile scurvy in North America. In all 379 cases were found, in 49 of which exophthalmos was recorded. This agrees fairly well with the statement of Holt that 10 per cent of the cases present exophthalmos. In 1912 L. R. DuBuys of Tulane University, added 13 cases, including one seen by himself. Huebner reported four cases of exophthalmos among 65 cases of infantile scurvy (6.15%) and Nicolai 13.17%. A rather careful search of the literature since 1912 revealed one other case of exophthalmos, reported by Brandes in La Clinique in May, 1912.

Exophthalmos occurs suddenly and may be so slight that it is referred to as a swelling of the eye, or so marked that the eye is lost from exposure and sepsis, as occurred in the case of Mr. Sutherland of London. It may be an early sign but usually appears as a late manifestation. The exophthalmos is often seen for the first time after a fit of crying and may occur in one or both eyes, either together or separately. There may be recovery followed by recurrence, or the eye may remain stationary and at intervals the symptoms increase. The exophthalmos is due to one of two causes, either a hemorrhage into the areolar tissue of the orbit or hemorrhage beneath the periosteum of one of the orbital bones. The latter corresponds to the condition found in other parts of the body and was demonstrated at autopsy in the cases of Meyer and Snow. In Snow's case the hemorrhage was found between the periorbita and the bone and filled almost the entire orbital cavity. The orbital plate of the frontal bone appears to be the most common site of the hemorrhage. When the latter extends in front of the fascia orbitalis, there is generally associated an ecchymosis and suggillation of the upper lid.

Infantile scurvy affects other portions of the ocular structures far less often than the orbit. Subconjunctival hemorrhage has been noted at times; and Hirschberg relates a case in which a large flame shaped hemorrhage occurred in the retina, appearing when the orbital hemorrhage was subsiding. Blood in the anterior chamber is reported in one case by Otto Kaltz; and Sidney Stephenson reports a case of ecchyomsis in the lower lid, unassociated with orbital hemorrhage.

The practical significance of the orbital hemorrhage and other ocular changes recorded, lies in the fact that they may be early symptoms and therefore be seen first by the ophthalmologist. A suddenly appearing exophthalmos in an infant is probably due to scurvy, since neoplasms and cysts never grow so rapidly and syph-

ilis can be excluded by other signs and tests. Traumatism is often suspected because of the frequently associated hemorrhage into the lids and should lead to an examination for the signs of scurvy. Retinal hemorrhage may be more common than reported thru failure to use the ophthalmoscope. Subconjunctival hemorrhage in an infant not suffering from pertussis would be a suspicious sign of scurvy.

CASE. On Oct. 25, 1920, I was requested by the attending physician to examine the eyes of baby S., aged one year. The history was that he had been well until one month previously, when he developed "rheumatism" in the legs. The child was pale and very irritable, especially when handled. There was no fever and no increase of pulse rate, and the urine was reported to be normal. The right eyeball began to protrude one week before the examination, the swelling subsiding within a few days, only to recur. After a second subsidence, it recurred a second time.

At the time of the ocular examination, the right eye was markedly exophthalmic but with motility unimpaired, except as due to the proptosis. There were no hemorrhages into the lids or conjunctiva and no chemosis. There were no pathologic changes in the retina; the eyeball was not tender and no mass could be felt.

The diagnosis of infantile scurvy did not occur to me; but the suddenly occurring exophthalmos, without inflammatory signs or preceding acute illness, could only be explained as due to an orbital hemorrhage, or edema of the orbital tissues and such was the explanation offered to the attending physician. A few days later the case was seen by an able pediatrician, who telephoned me that the child had all the symptoms of scurvy and that he thought the exophthalmos was due to an orbital hemorrhage.

The previous history of the case was typical of that found in infantile scurvy. The child was born at term

but had never been nursed, having been fed from the beginning on malted milk, which diet was continued to the age of eleven months. Feedings were then changed to Mellin's Food and pasteurized milk, both, of course, devitalized foods. At the age of ten months the legs became painful and swollen, the swelling being marked and extending from the knees to the ankles. No hemorrhages appeared in the skin and at no time were the gums swollen. A pseudo-

paralysis of the legs was present and the diagnosis made was rheumatism.

When the correct diagnosis was established, the diet was changed to raw cow's milk and orange juice, 1 dram of the latter three times a day. Within four days the exophthalmos had disappeared, the swelling of the legs had gone and the child appeared greatly improved in every way. There have been no further relapses and the child today is robust and healthy.

NOTES, CASES AND INSTRUMENTS

FOREIGN BODY SPUD ILUMINATOR.*

W. HOLBROOK LOWELL, M.D.

BOSTON, MASS.

Numerous methods of illuminating the cornea have been devised to facilitate the removal of foreign bodies. A

of the light and one with it, has been in the writer's mind for some time. The culmination of this idea is shown in the accompanying cut.

It consists of a fountain pen light with spring contact switch; to which is attached a smaller parallel barrel, equal in length, with a sliding member in

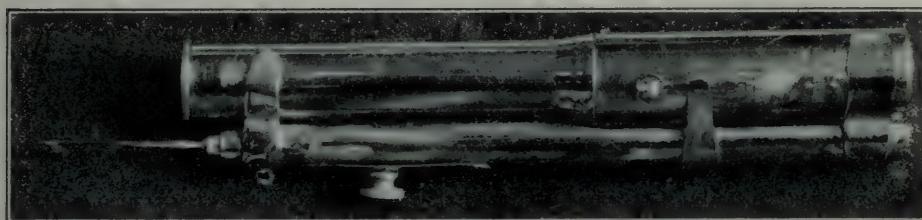


Fig. 1. Lowell's illuminator for foreign body spud or similar instrument, ready for use.

blepharostat is seldom used and with the left hand holding the lids apart, it is awkward to hold a lens or light at the same time. The small light fastened to the handle of an eye spud is good, but the wires from the battery must be maneuvered and the bulb arm adjusted.

For some years the writer has car-

this superimposed barrel. When the whole attachment is rotated on the fountain pen barrel, a tempered spring slides over the contact switch spring, thus giving a constant steady light. The spud is fastened in this sliding member. When pushed forward with the light on, as in Fig. 1, the spud point and cornea are well illuminated and the



Fig. 2. Lowell's illuminator with spud slid back into the barrel to protect it in carrying.

ried a fountain pen light and found it most convenient to carry and handy in clinic and office examinations. The possibility of fastening an eye spud to this fountain pen light, so that the point of the spud would be in the rays

light is where you want it when you want it, and the left hand is free to control the lids. The spud is protected when not in use by sliding it back into the barrel, as in Fig. 2.

The writer is indebted to Mr. Sach, of F. H. Thomas and Company, Boston, for his interest and zeal in carrying out these ideas.

*Shown at the meeting of the American Ophthalmological Society, June, 1921.

A NEW TEST CARD.

J. MONROE THORINGTON, M.D.

PHILADELPHIA, PA.

The experienced ophthalmologist knows only too well the uncertainty or confusion produced in the mind of a patient when English block letters are used, and for this reason Gothic letters are employed. The letters on each line have been well spaced. The lack of careful spacing on many test cards, especially with block letters, is a serious handicap, as the letters will appear to blend or run together if placed without sufficient space.

With the exception of the two letters at the top, the remaining rows of letters are numbered on the left, 1 to 9, from above downward. The numerals are colored red to assist in detecting the most common variety of color blindness, and at the same time by the use of these figures, the patient is enabled to indicate promptly the number of the lowest row of letters which he can see, without being obliged to go back and count the lines, as he does if other test cards are used.

There is a very gradual diminution in the size of the letters on the various lines from above downward; and all the letters are constructed on the angle of four minutes, as suggested by Wallace. This diminution in size of the letters permits the insertion of intervening letters, also in column formation, below the VI line. Care has been

x

taken that a proper proportion of round, diagonal and square letters is maintained in each line and column.

As the letter B is so often confused with and called the figure 8 or letter S, it has been eliminated; and vice versa, the letter S has likewise been omitted.

The letters R and K, being wide open at the bottom and having a comparatively small opening at the top, have a marked resemblance to the letter A and they, too, have not been used.

Ophthalmic license has been taken with the letter A, which is seen on lines 2 and 4, the horizontal bar of which has been lowered one-half a minute to increase the size of the triangular space just above the bar.

A has not been placed on the lines of small letters below the fourth line, as a patient occasionally states that he cannot see the triangular opening and only recognizes A because it is the only letter in the alphabet with a pointed top. This A, as the patient sees it, resembles an inverted V.

N, V, K, and Z, spoken of as diagonal letters, as they each have a diagonal line, are quite essential on every test card in correcting astigmatism at an off axis, i.e. an axis other than 90 or 180. E, F, H, L, and T, spoken of as square letters, are in common use for astigmatic errors at the more common astigmatic meridians, 90 and 180. G and also Q, with their individuality indicated by their straight and curled lines, respectively, are not good round letters like C, D, O, and U, and have been purposely omitted.

Patients do not readily commit this test card to memory, as they do the Snellen cards. Using this card two or three days in succession with the same patient, it is easy to vary the daily examinations by asking the patient on the second visit to read the letters backward from right to left and on the third day to spell the letters downward in column formation.

The visual acuity in feet and metric distance is indicated by Roman letters and Arabic characters at the right of each line.

This card, which is illustrated by the accompanying cut, is being made by Messrs. Wall & Ochs, 1716 Chestnut street, Philadelphia. It may be had with red numerals and yellow letters on black, with red numerals and white letters on black, and with red numerals and black letters on white.



CASE REPORTS SUBMITTED TO THE AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS.

It is often asked what kind of case reports should be submitted to the American Board of Ophthalmic Examinations. The following have been selected as examples of such reports acceptable to the Board, and are here published as containing matter of general professional interest. What would be a good case report for a medical journal will meet the requirements. But it is proper for this purpose to supply reports that go into details illustrating methods of examination, the technic of operating and the grounds upon which conclusions are based. Ordinary cases such as errors of refraction, muscle balance, conjunctivitis, etc., should be included. These are not published as the best reports that are being submitted to the Board but as good examples of those that have been considered satisfactory.

TUBERCULAR IRRITIS.

LIZZIE M. CARVILL.

BOSTON, MASS.

Female S. 41 years. Stenographer. Oct. 3, 1910. Diagnosis—Tubercular iritis.

Family history good. Father died at 70. Mother alive (84). Two sisters (43-45) living and well. Their families living and well. None of the near relatives have had tuberculosis in any form. None of the family have had trouble with the eyes other than those corrected by wearing glasses.

Previous history good. Only illness children's diseases. Seven years ago had an attack of iritis O. S. which lasted several months but cleared up leaving eye apparently as good as ever. Report from physician negative except patient very nervous and underweight. Weight 114 lbs.

History of present attack. 4 months ago O. S. became inflamed and has been treated during that time by an oculist, using 1% solution of homatropin. Condition of eye slowly growing worse. No pain.

O. S. Pupil slightly dilated, irregular and does not react to light. Slight conjunctival and ciliary injection. Numerous deposits on Descemet's membrane, some pin point and more numerous near the angle of the anterior chamber in the lower half, others larger and lardaceous looking. Two grayish brown nodules on the anterior surface of iris. Many vitreous opacities, both fine and large. Unable to see fundus. Pupils bound down by posterior synechiae. V. O. S.=20/200 with glass.

O. D. Slight conjunctival and ciliary injection. Pupil contracted. Many small deposits on Descemet's mem-

brane. Opacities of vitreous. Fundus normal. V. O. D.=20/30 with glass.

Instilled 4% atropin in each eye for one hour at 15 minute intervals. O. D. pupil slightly and irregularly dilated. O. S. not dilated at all.

Ordered. Fomentation. 1% atropin 4 times a day.

October 4. Pupils about the same. Instilled 4% atropin 6 times at 15 minute intervals.

October 5. Condition practically the same. Introduced atropin crystals in lower cul de sac. Treatment continued. To sleep with windows open, sit out on piazza during day. Three nutritious meals with 2 egg nogs between.

October 6. About the same. Introduced atropin crystals in sac.

October 8. Pupils slightly dilated. Shows several post-synechiae stretching out. Instilled 4% atropin 3 times at 30 minute intervals.

October 11. Case about the same. Instilled 4% atropin once.

October 15. O. D. Fairly well dilated.

October 22. About the same.

October 27. Consultation with Dr. D. who agreed with findings and diagnosis of tubercular iritis, but advised diagnostic dose of tuberculin be given.

October 28. A. M. Patient given injection of old tuberculin. Late afternoon had chill and rise of temperature. 9 P. M. temperature 102.3°.

October 29. A. M. 100.4°. O. U. marked congestion. 8 ciliary injection. O. S. another nodule on iris. P. M. T. 101°.

October 30. A. M. T. 99°. Eyes quite inflamed. P. M. T. 100.5°.

October 31. A. M. T. 98.4°. P. M. T. 100°.

November 1. A. M. T. 98.6°. P. M. 98.6°.

November 2. O. U. much less conjunctival and ciliary injection, pupils dilating, fewer fine deposits on Descemet's membrane. Patient given therapeutic dose of tuberculin 1/500,000 mg. Placed on a farm in high section of the country and followed a regular tuberculosis regime.

November 6. O. U. deposits clearing on Descemet's membrane. Vitreous opacities not as numerous. Posterior synechiae loosening up. Areas of pigment on lenses showing where some have broken away. O. S. fundus shows some choroidal changes in periphery of temporal side.

The injections were made twice a week for 3 months with no untoward results. The posterior synechiae were broken down in both eyes with the exception of one broad one on the base of the iris O. S. Patient remained in the country following out treatment for nine months, gaining 30 pounds. At the end of that time the eyes were quiet. Some large opacities in vitreous O. U. Descemet's membrane normal and irides normal.

September 11, 1914. V. O. D. + 2.50

S + 1.00 C ax. 180° = 20/20.

V. O. S. + 3.00 S + 1.00 C ax. 165° = 20/20.

Add + 1.00 S. O. U. for near.

Eyes normal except for vitreous opacities and irregular pupil O. S.

1915, September 15. V. O. D. + 2.75

S + 1.50 C ax. 180° = 20/20.

V. O. S. + 3.25 S + 1.50 C ax. 165° = 20/20.

Add + 1.25 S. O. U.

Eyes normal except for vitreous opacities and irregular pupil O. S.

1919, September 5. V. O. D. + 3.00

S + 2.00 C ax. 180° = 20/20.

V. O. D. + 3.00 S + 1.50 C ax. 165° = 20/20.

Eyes normal except for vitreous opacities and irregular pupil O. S.

1921, April 20. V. O. D. = 20/20 V. O. S. = 20/20 with present distant

glass. With present near glass reading distance 15½ inches. Continue with present glasses as her near work is using an adding machine. Fundus examination shows nothing abnormal except a few flocculent opacities of vitreous. Fields normal. General health good. Weight 139½ pounds.

CARCINOMA OF THE CARUNCLE.

G. M. DUCKWORTH, M. D.

CUERO, TEXAS.

W. H. S., aged 51, white, presented himself, November 30th with a growth from the inner canthus of the right eye covering the nasal portion of the sclera within 4 mm. of the cornea. The growth was about 3½ to 4 mm. in depth and adherent to both lid margins at the canthus. Vision 6/6. No induration of preauricular gland altho the submaxillary gland on the corresponding side was much enlarged and tender to touch. The pain in the eye was causing but little complaint, altho the patient did complain of severe pain at times in the right dorsal region. The growth had appeared about four months previously, and the patient thought it had grown more rapidly of late.

Clinical diagnosis: Carcinoma of the caruncle. A section of the growth was sent to the laboratory. Report: "Epithelioma of rather mild degree of malignancy, resembled basal celled carcinoma and would be diagnosed carcinoma if occurring on the skin." The patient was warned as to the possibility of recurrence if an effort were made to save the eye, and told that exenteration of the orbit was the safest procedure. He was also advised of the uselessness of the eye, and of the diplopia and other annoying symptoms which would ensue even if the growth were successfully removed. The patient against the wishes of the family declined exenteration or enucleation and insisted that the tumor be removed from the eye.

On December 3rd the growth was removed and found not adherent to the sclera. Sparing the internus muscle, as much of the tissue as was accessible in the space between the eyeball and the

orbital wall was removed. The submaxillary gland was excised and thermocautery applied to the lid margins where the growth had been adherent. After five days daily applications of radium were instituted. The wound cicatrized and healed after satisfactory reactions and the patient was able to go to his home, but for the severe pain in the dorsal region, which had grown more intense and constant since the operation. Pulse and temperature normal. Urine negative and Wassermann negative. A consultant pronounced the upper lobe of the right lung solidified which was verified by a radiograph. The patient was finally taken on a stretcher to his home quite a distance away, and he died in about forty days, presumably from a malignant disease within the thorax, altho the particulars of his death have not been communicated to me.

SYPHILITIC RETINAL DISEASE.

F. B. HARDING, M. D.

ALLENSTOWN, PA.

Mr. R. D. single, age 24 years, printer by trade, was referred 3/1/20, by the State G. U. Clinic for examination of the eyes after the 17th injection of salvarsan, by reason of a rapid failing of vision. The last injection was given three days before examination, when a marked increase in the cloudy vision developed. The first noted change in vision was six weeks ago, following the 14th injection. It started first in the left eye and was followed in about one week by a like condition in the right. It has developed slowly and the vision in both eyes has become gradually worse. Reading of large type has been lost for the past three days; floating spots were also lately noticed; and when in the dark, sparks or "balls of fire" were complained of.

The infection occurred about one year ago. He had the chancre in June, 1919; and the treatment was begun July 8th, 1919, with 0.4 gm. of arsphenamine, gradually increased to 0.6 gm. after the third injection. The injections were given at seven day inter-

vals with blood tests after six to eight injections, when two weeks were allowed to elapse. The Wassermann reactions diminished from 1 unit plus in July, 1919, to positive $\frac{3}{4}$ unit plus Feb. 9th, 1920, or at about the time the eye symptoms developed.

Up until this date no ocular trouble had been noticed. The injections were well born, and an improvement in the disease noted.

The lids, conjunctiva and cornea appeared normal; ocular movements were also normal. Vision R. 3/60. P. P. 16 cm? Type No. 2. L. 1/60. P. P. 16 cm? (with difficulty).

Both pupils appeared of a normal color but were very sluggish to light and convergence.

Under homatropin, mydriasis was very slow, the right pupil being concentric in position after 6 hours. The right cornea and aqueous and lens were normal. The right fundus was obscured by a haze of the vitreous in the posterior part. The papilla was slightly swollen and cloudy, with an indistinct outline and a slight increase of the secondary vessels of the disc.

The left eye ground was very indistinct and seen only in spots, the disc could not be seen, numerous dust like particles appeared thruout the vitreous, together with a web like formation, freely floating on movement of the eye.

Atropin 1% was ordered t. i. d., also KI 10 grains t. i. d., with a hot pack once daily; and the injections discontinued.

Four days later, 3/4/20, the vision had improved to 6/60 right eye and 1/60 left eye.

The vitreous of the right eye was somewhat clearer, the disc could be seen a little plainer. It appeared of a yellowish white color and of more distinct outline.

The left fundus was also somewhat clearer; the disc could be located but its outline remained indistinct due to the vitreous haze of dust and fine floating filaments.

The pupils of each eye had assumed the usual shape and amount of dilatation of four days instillation of atropin.

Rapid improvement of the vision followed so that on April 1st it was in the right 6/16 and in the left 3/60, with a corresponding clearing of the vitreous haze in each eye.

On April 3rd, the 18th injection was given and again a slight diminution of vision was noted, April 9th, Right 6/16-3, Left 3/60, when on the following day the 19th injection was given. This was followed by a marked loss of vision in each eye during the next twenty-four hours, together with frequent attacks of dizziness. The vision had fallen to R. 3/60, L. 1/60. A marked increase in the vitreous haze was noted in both eyes, taking on the form of flocculi in each, which obstructed the view of the fundus so that it could be seen only in spots. Following this second reaction and loss of vision the injections were discontinued. A Wassermann was made April 28th, which gave a delayed negative. The vision had improved in 18 days to R. 3/60, slight decrease of vitreous haze, allowing a few blood vessels to be seen, L. 3/15 with the flocculi occupying only the upper and more anterior part of the vitreous. The movement of the eye quickly up and down gave momentarily a better vision. Close reading was impossible. The potassium iodid and sweats were again followed out. The improvement of the vision was quite slow so that by June 4th, large print was seen by the left eye only, and vision had increased to 6/40 in the right eye and 6/16 in the left with the vitreous of both remaining hazy, and discs indistinctly seen, but the left much better than the right.

It is to be noted that now the left eye has the better vision, while the right, which cleared more rapidly after the first reaction, now shows less improvement than the left.

Vision 30 days after 1st reaction R. 6/60. L. 3/60. Vision 60 days after 2nd reaction R. 6/40 L. 6/16. A gradual improvement was noted so that by Aug. 10th, the vision had increased to R. 6/24, L. 6/8-2.

At this time a six days' course of mercury inhalations were started, after

which a remarkable improvement was noted in the right eye so that by Oct. 25th, the vision was R. 6/8, L. 6/6. No haze of any sort nor dust particles was discernible in either eye, the media being perfectly clear in both, the discs quite distinct but somewhat whiter than normal; otherwise the fundus presented nothing abnormal. The Wassermann reaction at this time proved negative. The pupillary reactions to light, convergence and accommodation were normal, the punctum proximum being 14 and 12 cm. respectively, for the right and left.

Was this reaction due to a sudden liberation of toxins from the spirochetae, or an irritation of the structures of the eyes, or an anaphylactic reaction? Also, why would the rapid saturation of the system by mercury inhalations clear up the vitreous haze, no demonstrable lesions remaining in the eyes, if there had been a true inflammation. Since neuroretinitis syphilitica is an inflammation of the optic nerve and contiguous retina, (the inflammation extending even into the optic nerve behind the globe, and always resulting in vascular changes, followed by edema, infiltration and hemorrhage, and later by proliferation of the mesoblastic tissues of the vessel walls and the neuroglia), why would such changes occur after 16 injections of arsenic extending thru 6 months, which resulted in an improvement of the Wassermann test (showing only $\frac{3}{4}$ unit positive), and then bring on such a sudden irritation, together with the rapid involvement of the vitreous, if it were only due to a sudden liberation of toxins from the killed spirochetae; and why would saturation with mercury clear up the vitreous, instead of again liberating the toxins and causing a recurrence of the irritation? Or could the condition have been brought about by the change from arsphenamin to diarsenol on the 13th injection (13th to 16th injection, at which time the ocular condition was first noted)? It may be possible that the change from one arsenic preparation to another, of a different mode of manufacture, brings about such

marked reactions; but the process looks more like an anaphylactic stage of the system both to the drug and the toxins liberated by it in the eye, which in this case was likely the weakest spot. No other cases of a similar nature have been reported to my knowledge and no exact cause assigned to such a condition thus far.

CHRONIC SIMPLE GLAUCOMA. IRIDOTASIS.

W.M. F. HOLZER, M. D.

WORCESTER, MASS.

Theodore H., Age 64, English, married, carpet weaver, come to the office July 10, 1920, complaining of indistinct and failing vision past three years, particularly the right eye, which failed about one year before the left. There had never been any pain associated with the failure of vision, no neuralgic headaches, nor rainbow halos.

Examination: O. D. Vision ?? of light perception. Anterior chamber was very shallow. Pupil measured 4 x 5 mm. oval, axis 90°, very sluggish. Media clear. Deep total pathologic excavation of the nerve head, with engorged veins bending sharply over the edge and pulsating at the base of excavation. The nerve was atropic, pale greenish color, lamina cribrosa very distinct. Arteries not unusual, veins markedly distended and moderately tortuous. Tension 52 mm. mercury (McLean).

O. S. Vision 5/60. Anterior chamber not quite as shallow as O. D. Pupil 3 mm. irregular in outline, slightly more active than fellow. Media clear. Deep glaucomatous excavation, engorged veins bending sharply over edge. No pulsation, except upon pressure on globe. Nerve more normal tint than fellow. Veins moderately distended and tortuous. Tension 46 (McLean). Field much contracted.

Immediate operation was advised to attempt to arrest destruction of the left optic nerve. Pilocarpin hydrochlorid 4 gr. to the ounce, four times

daily, and eserin sulphate 2 gr. to the ounce, at night were prescribed.

July 14, 1920. Iridotasis at City Hospital, record No. A 15596. Tension O. D. 48, O. S. 40.

Operation: Left eye. At 8:00 A. M. patient was given $\frac{1}{4}$ gr. morphin sulphat and 1/200 gr. hyoscine hydrobromat subcutaneously. At 8:30 one drop of atropin sulphat 1% was instilled. At 9:00 o'clock after four instillations of 4% cocaine hydrochlorat and 1-1000 adrenalin chlorid (separate solutions) at intervals of two minutes, the conjunctival sac was flushed with a warm 1:8000 mercury chloride solution, and a Clark (Weiss) speculum was introduced. The patient was directed to look down and the ocular conjunctiva was grasped with fixation forceps 10 mm. above the limbus at 12 o'clock and opened transversely 10 mm. The subconjunctival tissues were opened and carefully dissected free from the sclera down to the limbus. A Jaeger (Weiss) curved keratome was passed thru the sclera beginning 2 mm. above the limbus and emerging into the anterior chamber thru the angle. The keratome was introduced far enough to make the scleral incision 4 mm. in length. Fine curved iris forceps were introduced and the free border of the iris grasped at 12 o'clock and pulled gently into the wound,—the posterior surface of the iris then facing anteriorly. The conjunctiva was then pulled up in place, speculum removed, and the lids gently closed. A sterile dressing was applied, the eye bandaged, and protected by a Ring mask.

July 15, 1920. There was slight conjunctival injection at the wound. Anterior chamber was reestablished and deeper. There was a hernia of the iris thru the scleral wound, elevated 1 mm. and measuring 2 mm. broad. Roller bandage applied.

July 16, 1920. Eye dressed. Out of bed.

July 18, 1920. No injection. Bandage removed. Dark glasses.

July 24, 1920. Discharged from hospital. Globe white. Hernia of iris same as last noted. Using myotics in right.

July 27, 1920. At office. Vision 5/15.

August 13, 1920. Field showed slight enlargement. Vision 5/15 with + 1.25 + .50 x 180 = 5/10 less 2 letters. Tension O. D. 44. O. S. 22. Using myotics in right.

August 28, 1920. Tension O. D. 40. O. S. 24. Vision 5/15 with + 1.25 + .50 x 180 = 5/10 ordered.

October 11, 1920. Vision same. Field practically same as August 13. Tension O. D. 44. O. S. 22. Using pilocarpin in right.

The question arose as to the choice of operation in this particular case, trephine, iridectomy or iridotasis. Here was a man possessing only one seeing eye, in which the field of vision was markedly contracted. Having seen two late infections following trephine, and noted contraction of the visual field and occasional severe hemorrhage following iridectomy, I decided upon iridotasis, because of its simplicity, and ease and dispatch with which the operation can be performed; assets when the patient has but one seeing eye. The adrenalin controls hemorrhage from the conjunctiva, and the atropin dilates the pupil so that the sphincter of the iris does not pull the incarcerated portion away from the scleral wound.

ENUCLEATION; FAT IMPLANTATION.

WILLIAM W. LEWIS, M. D.

ST. PAUL, MINN.

J. S., aged 16, was first seen at the City and County Hospital, in the service of the writer, March 1st, 1921. A working girl. Previous history negative, except "sore eyes" in infancy, leaving a blind deformed eye, an unsightly protruding eye, scarcely covered by eyelids. General appearance, undersized, undernourished girl.

The right eye was apparently normal as to exterior, except nystagmus. Face asymmetric, oscillating nystagmus. In the left eye protruding staphyloma of the cornea. The left lids scarcely covers a misshapen globe. Anterior cham-

ber obliterated, iris adherent to cornea at centrally located scar. No pupil opening visible. Tension about normal. Fixation (cover test) oscillation. Movements unrestricted. Vision R. 1/10; L. light and shadows.

Ophthalmoscope: Right media clear; optic nerve head, deep inferior conus. Macula and periphery normal.

Treatment: March 3rd. Brow and lashes clipped. General anesthesia. Irrigation of conjunctival sac with boric solution. Conjunctiva snipped at the limbus, continued around the cornea; each of the four recti successively hooked and divided close to insertion in the sclera and the ends held with clamps. Optic nerve cut 1 cm. behind the globe. Obliques and remaining shreds freed. Globe removed. Hot normal salt pack applied while belly wall was opened. Belly wall, median line, opened and a small piece of fat dissected out. Opening in belly wall closed by encircling sutures to obliterate space. Piece of fat immersed in 95% alcohol and inserted into Tenon's capsule which was closed with a pucker string of catgut. Ends of oblique muscles sutured across stump. The conjunctival sac was closed with 40-day catgut. Pad dry dressing and bandage.

Mar. 4. Ice bag ordered to be applied continuously to hold down reaction which was considerable. Lids much swollen, some pain.

March 4. Tremendous reaction, discoloration; ice bag.

March 6. Lids almost black, tremendous reaction. Hot applications.

March 7. Lids look almost as if they would slough.

March 8. Reaction subsiding, considerable mucous secretion.

March 9 to 12. Reaction subsiding gradually.

March 12 to 18. Lids discolored but swelling of lids almost gone. Considerable secretion.

March 20. Considerable secretion, purulent.

April 1. Comes to the office. Styes on the lower lid. Stump looks good.

April 19. Glass shell given, fits fairly well.

April 15. Appearance is very good.

April 20. Getting along nicely. Stump is still edematous but conjunctival tissue covering is smooth and solid (firm). Motion is very satisfactory at this date. When shrinkage has progressed, a larger shell can be worn and more motion obtained.

REFRACTIVE ERROR WITH FOLLICULOSIS SIMULAT- ING TRACHOMA.

T. E. OERTEL, M. D.

AUGUSTA, GEORGIA.

February 12, 1921, T. A., male aged 20. Student at college. Family history negative. He had diseases of childhood and two years ago had tonsils and adenoids removed.

He has been obliged recently to study until one and two o'clock at night in order to prepare for examinations. He has experienced much trouble with his eyes, blurred vision, photophobia and pain in the globes. He had no headaches. For the past three weeks the lids have been stuck together each morning. He has never worn glasses and thinks his vision perfect.

A well nourished youth of blond type and ruddy complexion. Mental- ity above the average. There is a puffy look about the eyes and redness of the lid margins. The pupils are large, reaction to light and accommodation prompt.

The conjunctivae are deeply congested and studded with rows of succulent looking elevations of about one millimeter in diameter. These follicles are quite universal over both the lower and upper lids, the superior fornix and the plica semilunaris extending even beyond this fold onto the bulbar conjunctiva. The condition is bilateral. The conjunctival blood vessels are not easily made out on account of the swollen condition of the membrane. There is a small amount of mucoid secretion in each eye. No scar tissue

can be demonstrated, nor are any of the follicles ulcerated.

The corneae clear. The media and fundi negative.

Vision: R. 20/65 with $-0.75 \subset -2.50$ cyl ax. $90^\circ = 20/20$. L. 20/70 with $-0.75 \subset -2.50$ cyl. ax. $90^\circ = 20/20$. Near add 0.50.

A prescription of homatropin hydrobromat was given him with directions to instill a drop in each eye every half hour for four hours and return at the expiration of this time for further examination.

Feb. 13. Under the cycloplegic skiascopy yielded the following result: O. D. cyl -3 ax. 90° , O. S. cyl -3 ax. 80° . With this correction his vision was 20/20 in each eye. Orthophoria.

Feb. 14. He has recovered from cycloplegic. Vision, O. D. with cyl -3 ax. $90^\circ = 20/13$. O. S. cyl -3 ax. $80^\circ = 20/13$. This prescribed in spectacle frame for constant wear.

Diagnosis: 1. Astigmatism—myopic, against the rule. 2. Follicular conjunctivitis, severe, result of eye strain. He was given an alum stick and instructed to apply it to the lids twice a day.

Feb. 17. Eyes quite comfortable, he is delighted with his glasses and improved vision. The congestion of the lids and folliculosis improved. Instructed to report in a month.

March 21. Folliculosis almost gone. Still a few granules on the lower conjunctivae. He has been able to do his college work with comparative comfort.

The case is of especial interest on account of the resemblance of the conjunctival condition to trachoma, which the sequel shows it was not.

MALIGNANT GROWTH OF LEFT EYEBALL PROBABLY SARCOMA OF CORNEA.

T. E. PEERY, M. D.

BLUEFIELD, W. VA.

M. F. F., age $2\frac{1}{2}$, female, white, came to my office July 17, 1920.

Diagnosis. Malignant growth of left eyeball, probably sarcoma of cornea.

Complaint. Growth on left eye; progressively getting larger and causing pain.

History. Family: Mother's aunt died of cancer. Personal: At 6 months of age, a white spot was noted on the eyeball which remained about the same size for about 5 months, when it began to spread; child was taken to family physician who treated it at various times but it continued to grow until the parents became alarmed; after it began to grow rapidly, they decided to consult a specialist; for the last 3 weeks the child has had no appetite, and has been nauseated, suffered a great deal of pain, especially at night, and would not play around.

External Examination. R. Lids, lacrimal apparatus, cornea and iris normal; pupil reacts to light and accommodation. L. Large, irregular, fibrous growth involving globe and protruding between lids; none of intraocular structures recognizable.

Ophthalmoscopic Findings: R. Cornea, lens media and fundus normal. L. Pupil obliterated.

Treatment. Consultation held with Dr. R. O. Rogers, of the Bluefield Sanitarium in regard to enucleation and radiation. Enucleation decided upon to be followed by radiation. The father was advised accordingly but he refused to have this done until he could consult his wife; and the child consequently returned home.

July 22, 1920 the patient returned to the hospital for the operation. The usual preparations for the operation were made.

Patient. The face, lids and surrounding areas were thoroly cleansed with warm water and soap, and washed with 1/2000 bichlorid solution.

Instruments. The instruments were boiled in 1% solution of soda, rinsed in sterile water and placed in sterile gauze to dry.

Surgeon and Assistants. The hands were scrubbed with warm water and soap, washed thru 1-1000 bichlorid solution and then rinsed in sterile water.

July 22, 1920. Postoperative Diagnosis. Malignant growth of left eyeball, probably sarcoma of cornea.

Condition of Patient. Temperature, 100°. Respiration, 32. Pulse, 110. Blood pressure, not taken. General condition bad. Anesthetist, Dr. R. O. Rogers. Anesthetic, ether. Assistant, Miss Laura Hawley, R. N.

Operation. Enucleation of left eyeball and immediate application of radium. Condition of patient during operation fair.

What Was Done. I introduced Weeks' speculum and locked it. I then picked up the conjunctiva half way back from the limbus with a mouse tooth forceps, dissected around the growth, cutting thru Tenon's capsule. The internal rectus muscle was picked up on a strabismus hook and severed far back from its attachment to the sclera with Stevens' scissors. The dissection was carried to the superior rectus muscle, the external rectus muscle and the inferior rectus muscle which were similarly picked up and severed far back from their insertion. A strabismus hook was passed all around the globe, heel foremost, and all adhesions found were picked up and severed, entirely freeing the globe except from the superior and inferior oblique muscles and from the optic nerve. I then passed the closed enucleation scissors between the conjunctiva and eyeball on the nasal side with the points hugging the eyeball, located the optic nerve, opened the scissors, engaged and cut it as far back of the globe as possible. The protruding globe was then pulled forward and the superior and inferior oblique muscles were cut. A sterile gauze sponge was then introduced into the socket, left 3 minutes, removed and the remaining conjunctiva closed by a purse string suture. The socket was then irrigated with a 1/5000 bichlorid solution and the patient turned over to Dr. Rogers who applied radium.

July 22, 1920, 9:30 a. m. Dr. Rogers immediately placed 50 mg. of radium carrying a full complement of screens for beta and secondary rays within the orbit. The cavity resulting from the enucleation furnished a space into which the radium with its screens fitted snuggly, and occupying a central position within the orbit, the condition

was ideal for the rays to come in contact with and produce destructive effect upon all local malignant cells which an enucleation alone does not include. A simple dressing was applied as in any ordinary enucleation.

This being a condition heretofore almost certain of recurrence with fatal termination, the primary object was to destroy entirely the malignant tumor, and no consideration was had for a socket which might later hold an artificial eye. To this end, the radium was left in place for a period of 24 hours, making a total dose of 1200 milligram hours.

July 23, 7:30 a. m. Condition of patient good; patient not suffering. 9:30 a. m. Dressing and radium removed by Dr. Rogers. The conjunctival sac cleansed with saturated solution of boric acid; lids closed; dressings and bandage reapplied.

7:30 p. m. Condition good. Dressings removed, sac cleansed and rebanded. Patient was seen night and morning each day until August 4 and improvement noted.

July 25 to August 3. The usual treatments were given on these dates.

August 4. Definite signs of moderately severe radium burns, including both lids and apparently all soft tissue in the orbit were observed at this time. The patient was allowed to return home with instructions given parents for irrigations and treatments.

August 14. Patient in good condition; burns healing nicely; lids not distorted by burns; general health improving. Former instructions as to treatments repeated.

September 18. No return of growth; child's appetite good; gaining flesh; runs and plays. Father states that she is like a different child.

November 6. Still improving in every way. No return of growth.

January 11, 1921. No return; child apparently in excellent condition.

April 30, 1921. No return of growth; child well and apparently strong.

This case is being watched at regular monthly intervals by Dr. Rogers and myself with the intention of continuing these inspections for the next three years.

NEOPLASM OR CYST OF HYPOPHYSIS CEREBRI.

MARCUS RAVDIN, M.D.
EVANSVILLE, INDIANA.

April 29, 1913, Dr. C. P. B., aged 43, Physician.

Family History: Father well. Mother and two sisters tuberculosis. Five brothers living and well. No cancer history in the family.

Personal History: Alcohol and tobacco moderate until two years ago. Habitual heavy eater. General health good except for occasional gastric disturbances. No venereal infection.

Complaint of patient: Slight headache. Difficult reading, especially at night. Distant vision very poor in left eye for last year or more. No epiphora. No haloes, no vertigo. Wants glasses to enable him to read. Had some from an optometrist, but did not help him much.

Examination: Lid margins, palpebral and ocular conjunctiva normal. Corneas clear. Anterior chambers of good depth. Pupils round, right 3 mm. left, 4 mm. React sluggishly to light, consensual and in accommodation. Tension by finger palpation normal. Vision L. 10/200 R. 20/30, no improvement with glasses. Reads No. 3 Jaeger, with + 1.50 with right eye only.

Ophthalmoscopic examination: Right media clear, optic disc round, margins well defined, blood vessels normal. No perceptible retinal lesion. Left: Media clear, optic disc well defined margins, pale yellow, more so in nasal half. Large blood vessels appear normal. The small vessels are hardly visible.

Fields of vision: Absolute bitemporal hemianopsia, and slight contraction of retained field. Charts submitted. Attempts at this stage of the examination to elicit hemianopic pupil reaction of Wernicke failed to bring out the reaction properly.

Examination Nose and Throat: Septum straight. Turbinals normal. No secretion from ethmoid region. Transillumination of anterior accessory sinuses negative. Tonsils apparently not infected.

Tentative Working Diagnosis: Pituitary tumor or cyst. Pressure on optic,

chiasm. The significance of bitemporal hemianopsia was discussed with the patient. Advised him to consult Dr. Harvey Cushing, or Drs. Spiller and Frazier as soon as possible. In the meantime recommended Roentgenograms of the accessory sinuses and sellar regions to be made.

History: December 10, 1913: Dr. B. came to see me. States that his vision is about as before except that he has more difficulty when driving at night. Declined further examination of his eyes. Is taking K.I. and mercury on general principles. When again urged to consult Dr. Cushing or Dr. Frazier, or at least have a Roentgenogram made, he said, "Well, what is the use. Cushing or Frazier will advise a brain operation and I am not willing. I hope you are mistaken in your diagnosis."

July 23, 1918. Was called over the telephone by Dr. J. Y. Welborn, chief surgeon of the Walker Hospital, to come for consultation. Stated that Dr. B. had been brought in unconscious.

Mrs. B.'s statement to me at the Hospital: "After my husband's second visit to you in 1913, his headaches became more often and severe. He had great difficulty in reading, and he could not practice much. His memory has been poor for the past year. Has been drowsy and at times it has been difficult to rouse him. For past six weeks has had

intense headache. Two days ago became delirious. There has been albumin in his urine for the last three or four years. No sugar. Voided urine in large quantities. Had marked thirst lately and drank large quantities of water."

I found Dr. B. in active delirium. Impossible to make satisfactory fundus examination. Consultation with Dr. Welborn. Advised decompression. Radiograph taken next day showed large sella. (Print submitted.)

July 25, 1918: Bilateral temporal decompression. (Dr. Welborn.) Brain bulged into trephine opening. No pulsation. Swg. drain.

August 10, 1918: Regained consciousness a few days after operation. Sees dimly with the right eye. None with the left. Pupils semidilated. Very slight response.

Ophthalmoscopic examination. Right eye, choked disc. Left eye, optic disc pale yellow thruout.

August 19, 1918: Left the hospital after being up and about a few days. Gaining in strength. Mind not entirely clear, but recognizes his wife by her voice. Family again advised to take Dr. B. to a brain surgeon.

Dr. B. died at his home some few months later. In deference to his wishes while still sound in mind, the family made no attempt to have him operated on. No autopsy.

A VISIT TO DR. J. KOMOTO OF TOKYO.

HARVEY J. HOWARD, M.D., Oph.D.

PEKING, CHINA.

This paper contains a personal narrative that may help to acquaint Western ophthalmologists with the conditions and developments of ophthalmic practice in the far East. It also records historical data of interest and importance.

To be acclaimed the "Father" of an important branch of science in a country, during one's lifetime by one's own countrymen, is an honor accorded to but few men. The "Father of Ophthalmology" in Japan is the name given to Dr. Komoto of Tokyo by fellow physicians of his native land. This does not mean that Dr. Komoto was the first physician to take up the specialty of ophthalmology in that country. The untimely death at the very beginning of his career of Dr. Ume, the first native professor of Ophthalmology of the Imperial University Medical College at Tokyo, placed the responsibility of teaching that specialty to the students of the only medical school of any consequence then existing in Japan, upon the brilliant young man who had just returned from three years of study with the leading ophthalmologists in Germany. It is Dr. Komoto then who for thirty years has taught and inspired generation after generation of undergraduates and who has been largely responsible for the postgraduate training of the majority of the men who have done so much to establish a high standard for ophthalmology in Japan.

With the knowledge of such a career in mind, one can possibly imagine the surprise of the writer on meeting Dr. Komoto in the summer of 1919, and finding him a vigorous man, apparently in the prime of life. This meeting occurred at his summer villa in Karuizawa, which, with an elevation of 3200 feet and with the active and glorious volcano Mt. Asama only nine miles away, is one of the favorite spots, during the hot summers of Japan's lowlands. I was charmed with his gracious manner and his congenial smile, I was impressed with his hearty laugh, his rapid, clear-cut speech and his tremendous energy. Dr. Komoto does not

speak English, but reads and speaks German fluently. It was, however, in his native tongue that he preferred to speak thru our interpreter.



Professor Jiujiro Komoto, Tokyo, Japan.

During the summer of 1920 I again had the privilege of meeting Dr. Komoto; this time at the eye clinic of the Imperial University Medical College in Tokyo, and later at his home and his private hospital in another part of that immense city.

He apologized because he was working in the same outpatient building

in which he began his career as Professor of Ophthalmology thirty years ago. But to me it was an inspiration to see still in actual use the very place where our branch of medical science was initiated in the empire of Japan, and where many of the leaders in ophthalmology in that country had their original training.

In the policlinic, as the outpatient department is called in Japan after the

pan. He thought that the normal ratio between cataract and glaucoma in the Tokyo district was about three to one, which was about the same proportion, it seemed to him, that occurred in Germany. The classical Graefe operation for cataract is still adhered to. In fact I failed to find any Japanese ophthalmologist in my visits to nineteen of the twenty medical schools in Japan, who stated that he was employing any



Outpatient entrance, Department of Ophthalmology, Imperial University Medical College, Tokyo, Japan.

German fashion, approximately 8000 new eye patients were treated last year by Dr. Komoto and his four full time assistants. Dr. Komoto stated that fully twenty-five per cent of their patients have trachoma, which is a lower percentage than is found in other cities of Japan. Over half of those refracted were myopic.

Adjoining the policlinic are the in patient wards, which contain thirty-five foreign style beds. The new building for the eye department, which is to be erected in the near future, will have fifty beds, including ten for contagious cases. Dr. Komoto said that they performed a great many operations for glaucoma, but attributed this to the fact that these cases were referred to the hospital from all over Ja-

of the methods of intracapsular extraction.

There is one phase of work which a visitor will never fail to see in a Japanese medical college hospital, and that is laboratory work. In Dr. Komoto's department I was shown into two eye laboratories, the combined size of the two being about 20 by 60 feet. Pathology and bacteriology are given a large place in his regular departmental and postgraduate work. An equipment, including four microtomes, three incubators and a photomicrographic outfit in these rooms, is proof that opportunity for independent work is given to any assistant who wants it. A Japanese scientist is loath to speak much about his research work, but I gathered from remarks made that

staff members were engaged in special problems relating to vitamines and the eye.

A feature of Japanese medical schools and hospitals is the independence of the various departments. This is nowhere better illustrated than in the matter of large departmental libraries, and the usual lack of a central library. This has its advantages as well as its disadvantages. In Dr. Ko-

duced by 48 hours of lectures and demonstrations. The practical work consists of amphitheatre clinic for 24 hours and polyclinic for 36 hours. In the latter, the students are divided into groups of six or eight and are assigned patients for examination. Work in the dark room is considered very important, and students must learn to use the retinoscope and ophthalmoscope. The dark room in Dr. Komoto's depart-



Eye ward and connecting corridor, Imperial University Medical College, Tokyo, Japan.

moto's department I was shown into two other rooms, one of which was Dr. Komoto's own study and library and the other a study and library for his staff. On the shelves of these rooms there were the following current ophthalmic journals: American 2, British 1, French 3, German 7, Japanese 5; total 18. There were also many journals of other branches of medical science. In addition there were several thousands of volumes of bound journals and monographs, among the latter familiar books of recent publication by American authors.

The undergraduate course in ophthalmology at the Imperial Medical College in Tokyo consists of 108 hours of instruction and is given in the senior or fourth year. The subject is intro-

ment is 18 by 44 feet in size and gives an adequate opportunity for class instruction or for each student to make his examinations. The eye curriculum therefore is essentially a practical one. It enables the professor and his assistants to be in close contact with the students throughout the course.

There is no such thing as short post-graduate eye courses in Tokyo or in any other institution in Japan, as far as I could learn. Graduates are admitted as assistants and as such contract to remain at least a year. They generally remain longer than one year and are advanced in their grade of assistantship as they progress. Many of the leading ophthalmologists in Japan have early in their career been assistants in Dr. Komoto's department. Postgrad-

uate students are also admitted, many of them on scholarships. But these men, also, must remain at least a year and practically enter on the basis of junior assistants. Those who show unusual ability may later be taken on as assistants. In any case the mistake is not made either by the teacher or the student in supposing that an eye training can be secured in three months.

On account of the inadequate facilities for taking care of the better class of private patients in the large general hospitals in Japan, a great majority of the most successful physicians have developed their own private hospitals. Dr. Komoto has an eye hospital of sixty beds adjoining his home. The only foreign feature about this dainty place, is the large eye examination room with its modern equipment, and the drug room next door. Everything else is typically Japanese. At the outer door we leave our shoes and the servants provide us with house slippers. Thruout the hospital we hear the soft slip-slap of the nurses and attendants as they go about their duties.

The private rooms are all occupied. There are sliding doors that open on every side. The patients are lying on the floor, which is covered two inches thick with choice matting. Sitting on the matting beside the patient is a relative or an attendant fanning the patient or rendering some other little service, like pouring out his tea. As we follow Dr. Komoto, he tells us about his cases. Along one aisle are the severe cases of gonorrhreal ophthalmia and trachoma. In another section are the cataract and glaucoma cases. There is nowhere the slightest odor that reminds one of a hospital. Everything is wonderfully clean and the wood-work in natural color is shining. The only odor is from the pine wood and the new matting. There are no flowers, however. To the superstitious Japanese, a flower, today full-blown and filling the air with fragrance, tomorrow seared and withered, betokens the speedy approach of death. Instead, therefore, of cheering a patient, the sight of a bunch of flowers or a

lovely plant fills him with gloomy apprehension.

In his home, like all true Japanese, Dr. Komoto wears the native costume, but generally dresses in foreign style clothes when he goes to the University. I had heard much also about Mrs. Komoto, and had hoped to meet her, but she was at their summer home in Karuizawa. Mrs. Komoto has all her life taken an active interest in philanthropic and religious work.

From one of his friends and former students, I was able to gather some information about his life. Dr. Jiujiro Komoto was born on August 15, 1859. His native town is Toyoka, in Tajima Prefecture, which, located in the northern island of Hokkaido, lies opposite Vladivostok. Dr. Komoto's mother died when he was only eight years old. His father was a "Samurai" or knight who saw much active military service; so the child knew little of peace and happiness at home.

The boy did not receive a regular primary or middle school education. In his early years, he acquired under private instructors some knowledge of Chinese literature. At the age of fifteen he was sent to Yokohama, where he received instruction from a German, Herr Kaspell. From him he acquired the German language. At this time he conceived a great interest for geography, and used to read Karl Ritter, the geographer, a great deal. Indeed, so deeply interested did he become in the subject, that he wished to be a geographer himself; but to this choice an uncle who was responsible for his education would not consent, so the youth turned to medicine. At the age of 26 he graduated from the Imperial University Medical College in Tokyo. Following this, he was an assistant in surgery for three years under the famous German teacher, Dr. Scriba, who, in addition to his work in surgery, taught ophthalmology at the Tokyo institution from 1885 to 1889. At the close of this period of service, Dr. Komoto was selected by the Imperial Government to go abroad for further study.

So he went to Germany, settling first in Freiburg, where he studied ophthal-

mology under Manz. Later he proceeded to Würzburg, to be under Michel; then to Berlin, where he received instruction from Hirschberg. Finally he visited Vienna, to work with Fuchs. Dr. Komoto returned to Japan in 1891, at the age of 32, and was appointed Professor of Ophthalmology in the Imperial University Medical College in Tokyo. Eight years later he revisited Europe, spending a year there in special study.

Dr. Komoto holds the degrees of "Gakushi" and "Hakushi," which correspond to our M. D. and our Ph. D. respectively. Graduates of the Imperial University Medical Colleges receive the former degree. The latter is given to a candidate upon the acceptable completion of research and the presentation of a thesis. If the paper is accepted by the professors of the University, he is recommended for the degree of "Hakushi," which is given by the Minister of Education of the Imperial Government.

Dr. Komoto has been decorated by the Emperor with the First Order of Merit of the Rising Sun, and given the Sixth Rank at Court. This may mean more after one is informed that altogether there are nine orders and sixteen ranks. Among his fellow countrymen he is therefore considered a high official of the first class.

On account of his scientific contributions, Dr. Komoto holds a place of high esteem throughout the world. Among his numerous works should be mentioned his "Ganka Kaku" (Textbook of Ophthalmology) in three volumes, and his "How to use the Ophthalmoscope." Last year there was published a "Jubilee Volume" celebrating Professor Komoto's sixty-first birthday. Abstracts from this work appeared in the April number, 1921, of this journal.

Dr. Komoto has been a faithful contributor to the journal of the Japan Ophthalmological Society since its inception twenty-four years ago. Most of his writings have appeared in this monthly journal, which is the leading ophthalmologic journal in Japan. An analysis of the titles of his 190 articles

that have appeared in this journal show a wide range of interest and experience. They may be classified as follows:

Operations	
Cataract	8
Glaucoma	7
Lids and conjunctiva	16
Orbit	7
Miscellaneous	7
<hr/>	<hr/>
Total	45
Injuries to the eye	20
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Diseases	
Ocular manifestations of general diseases	10
Ocular manifestations of syphilis	8
Ocular manifestations of tuberculosis	3
Diseases of the lids and conjunctiva	8
Diseases of the cornea and sclera	10
Diseases of the choroid, not including sympathetic ophthalmia	1
Diseases of the optic nerve and retina	11
Sympathetic ophthalmia	7
Toxic amblyopia	2
Tumors of the eye	15
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Anomalies	
Congenital anomalies	10
Anomalies of accommodation and ocular movements	7
Refraction	2
Remedies	3
Apparatus	5
Diagnostic methods	4
Photography and art	2
Experimental physiology	1
History of ophthalmology	16
<hr/>	<hr/>
Total	190

This analysis shows that Dr. Komoto is essentially a clinical man, since 171 articles refer to the diagnosis and treatment of ocular diseases, injuries and anomalies. Of the remaining 19 articles, 16 are devoted to subjects that may be classified under history of ophthalmology. In a country where laboratory work of the research type is stressed to the detriment of the clinical work, it is fortunate indeed for the soci-

ologic and humanistic side of ophthalmology that Dr. Komoto has either by preference or by fate devoted most of his energies to the care of his multitudes of patients. It has created a confidence in and a desire for the best kind of western medicine among a people who were slow to give up their prejudices in favor of the old. It has done more than anything else, perhaps, to develop in Japan a large body of ophthalmologists who, in contradistinction to the attitude of very many Jap-

anese medical men, consider their profession a healing art rather than an opportunity to secure subjects for their experimental laboratories.

Japan does indeed owe Dr. Komoto a debt of gratitude for his untiring service to her people. It is good therefore to know that he is "not without honor" in his own country. It is certain that no one will ever be able to dispute the title that his fellow physicians have given him, "The Father of Ophthalmology in Japan."

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

SOCIÉTÉ BELGE D'OPHTALMOLOGIE.

May 1st, 1921

Interstitial Keratitis from Injury.

WEEKERS, Liege, reports a case of typical interstitial keratitis, occurring after duly verified injury, in a man 60 years old who worked in a quarry. There was no trace of syphilis and the Bordet-Wassermann reaction was negative.

A diagnosis of interstitial keratitis from injury should not be made except after most careful consideration. All of the cases in the literature cannot be accepted as authentic. In some cases, it is a question of coincidence; in others the injury never existed but was invoked in order to demonstrate freedom from disease. When the injury actually occurred, as in most of the remaining cases, it acted only as the exciting cause for the manifestation of the syphilis, in an individual already infected.

However, the above case shows that the question must remain open, for in it there was typical interstitial keratitis; but the most searching clinical examination did not permit of attributing the lesion, even indirectly, to syphilis.

The problem is also complicated by forms of deep, atypical keratitis, involving often only a portion of the cor-

nea. Such cases, probably due to injury, are not so exceptional. The observation of many such cases has convinced the author that they are entirely local in nature and uninfluenced by syphilis or any other general disease. Sometimes one finds as the origin of these lesions a slight loss of superficial substance, so slight that it might easily be overlooked. The superficial lesion is the seat of an infiltration extending, not along the surface, but to the interior of the corneal parenchyma. This deep infiltration shows an acknowledged predilection for the center of the cornea. Perhaps in these cases, the outer surface is immune to bacteria so that the lesion propagates only in the interior of the corneal parenchyma.

Aniridia and Glaucoma.

WEEKERS, Liege, presented the case of a patient, 48 years old, who had aniridia in both eyes, with congenital cataract and glaucoma. One of his children, 8 years old, suffered from bilateral buphtalmos with aniridia and cataract, with luxation of the crystalline lens above in one eye.

Great importance is attached to the light that such cases throw upon the origin of the intraocular fluids and the pathogenesis of glaucoma.

The inferences regarding the normal aqueous humor, as drawn from the aniridic eye, have been raised as the

chief objection to the iridic origin of the aqueous. On the other hand, the coexistence of aniridia and glaucoma seems to destroy the theory attributing glaucoma to an obstruction in the elimination of the aqueous humor at the line of the iridocorneal angle. In reality, the process is not so simple. Anatomic examination has shown that aniridia is never complete. It is, therefore, not impossible that the iris elements, present in aniridia, suffice to give birth to the aqueous humor. It is also possible, considering their peripheric location, that they obstruct the iridocorneal angle. The necessary conclusion, therefore, is that it is not possible to make a definite deduction from these facts either as to the origin of the aqueous humor or as to the pathogenesis of glaucoma.

In this glaucomatous and aniridic patient, pilocarpin reduced the tension to normal in both eyes. Nevertheless, it has long been believed that pilocarpin in the treatment of glaucoma is closely associated with changes in the pupil and iris. However, according to Groenholm, pilocarpin acts upon the ocular tension thru the vessels; by constricting the vessels, it diminishes the production of aqueous. This theory explains better the conditions observed in Weekers' patient.

Familial Nonsyphilitic Retinitis.

KLEEFELD, Brussels, stated that in three boys and two girls belonging to a family of eight children, there occurred diminution of vision at the age of ten and a half, with central scotoma for green and red; accompanied by retinitis punctata, more marked in the macular region, and optic atrophy. The Bordet-Wassermann was negative.

Extreme Unilateral Miosis.

KLEEFELD, Brussels, reported the case of a woman suffering from extreme miosis of one eye, without any concomitant nervous lesion.

Subconjunctival Injection of Glycerinated Extract of Testicle.

KLEEFELD. Glycerinated extract of testicle in subconjunctival injections is mildly hypertonic, because of the gly-

cerin, and irritant, because of the organic substances.

Therapeutically, it can be used to induce the resorption of exudates, as fine, dustlike, vitreous hemorrhages. This treatment is more effective and more prolonged than those generally employed. It is sufficient to make one injection a day, for from three to five days, that is until the conjunctiva is permanently congested. A month's intermission will then be necessary before the second series of injections.

Silver Salvarsan in Syphilitic Affections of the Optic Nerve.

The experiments of RASQUIN (Namur) have convinced him that silver salvarsan, when properly administered is not a dangerous medicine.

Pseudoblastomys.

MARBAIX, Tournai, and VAN DUYSE, Gand. Exophthalmos with paralysis of the third nerve developed in a patient without inflammatory symptoms. The globe could not be pressed backward. Diagnosis; malignant retrobulbar tumor. A Krönlein operation was performed, but no tumor was found. On resection of the lacrimal gland, it was found to be hypertrophied behind. Resistant tissue in the walls of the orbit could not be felt with the finger.

Histologic examination: Disseminated, perivascular, lymphocytic foci were found. There were lymphocytes and diffuse plasma cells in the vacular spaces. There were hyalin degeneration of the vascular walls and, finally, lesions of chronic inflammation. The exophthalmos was reduced, but the ptosis was accentuated; and vision was reduced to 0.1 by a film of neuroparalytic keratitis.

The examination of the blood, after the operation, showed an excess of lymphocytes over polynuclear leucocytes, that is a lymphocytopenia. The hemoglobin count, hematocrit and white corpuscles were normal.

Tuberculosis and syphilis were clearly excluded.

The histologic lesions were identical with those which Birch-Hirschfeld describes successively as disseminated lymphocytosis (1905) and diffuse lym-

phocytosis (1909). According to Meller, lymphocytosis is always compact, but according to Hocheim, it may be diffuse.

Considering the normal state of the blood in his two operations, Birch-Hirschfeld rejected the idea of a general disease, such as the pseudoleukemia supposed by Hocheim. He admits hyperplasia of the preexistent lymph tissue (the embryonic perivascular layers of Ribbert) and concedes that a neoplasm may be the unique and only symptom of a general disease, as is shown in the present case by the fact that neither the blood nor the peripheral glands were involved.

The histologic examination should take account of the lymphosarcoma of Kundarat, which is sometimes diffuse and which arises from the sphenoid; as well as the leucosarcoma of Sternberg, which was demonstrated by clinical examination.

The study of lymphomas is of primary importance in the diagnosis of orbital tumors. All tests should be applied in such diagnosis; Bordet-Wassermann, tuberculin, opsonic index, leucocytosis, and rhinologic and X-ray examination.

Congenital Obstruction of the Lacrimal Passages.

LEBOUCQ, Gand. Of six children, born to healthy parents, five showed immediately after birth a bilateral lacrimal obstruction. The remaining child had a monolateral obstruction. Probing resulted in immediate cure.

Paralysis of the Lids in Cataract Operation.

VAN LINT, Brussels, uses a 2% novocain solution, with a drop of adrenalin to each cc., added. A 3.5 cm. needle is entered 1 cm. back of the point of intersection of a horizontal line, passing the lower margin of the orbit, and a vertical line at its external margin. He injects 2 cc. of the solution to within 5 mm. of the lower margin of the orbit.

A second puncture is made 1 cm. above the first. The needle is directed upward, and 1 cc. of the solution is injected as far as the external palpebral ligament. A third puncture is made

on a line with the outer terminus of the eyebrow, and 1 cc. of the solution is injected from above downward to the external palpebral ligament.

Such paralysis of the lids greatly facilitates a cataract operation.

Siderosis of the Eye.

In a case of siderosis, H. COPPEZ, Brussels, examined the aqueous humor with the Gullstrand slit lamp. It appeared yellow in color. Chemical analysis demonstrated the presence of iron.

MARCEL DANIS,
Secretary.

NETHERLANDS OPHTHALMOLOGICAL SOCIETY.

56th Semiannual Meeting

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PROF. G. F. ROCHAT, Presiding.

Persistent Facial Slit and the Origin of the Tear Ducts.

J. VAN DER HOEVE showed photographs of a child on the left side of whose face the facial slit had remained partially open and had produced a large coloboma of the lower lid. The lower punctum was situated to the temporal side of the coloboma. Both tear ducts were shown in a Roentgenograph after thorium injection, with sounds in the upper and lower canaliculus. Altho this congenital deviation seems to prove that the canaliculi originate from the lid margins, van der Hoeve still accepts the opinion of Ask that the canaliculi originate as shoots from the lacrimal sac; and he showed histologic, embryonic specimens of Ask.

Ocular Symptoms of Osteomyelitis of the Superior Maxilla in New Born.

E. MARX stated that what is at the present time called osteomyelitis of the superior maxilla in the new born was formerly called acute sinuitis of the antrum of Highmore. It presents some ocular symptoms, and during the last nine years Marx saw three cases. The first, a child a few weeks old, had conjunctivitis, a fistula in the neighborhood of the right tear sac, a yellowish

secretion from the right nostril and a hard palate. To this last symptom, his attention was not called; he discovered it later. The true condition was not recognized; it was supposed to be a suppuration of the tear sac, altho on pressure no secretion appeared. The tear ducts seemed normal so that after the surgeon had taken care of the osteomyelitis, the conjunctivitis and the fistula were quickly cured by cleansing.

The second child had a purulent secretion in the mouth from both the superior maxillae. The upper and lower eyelids were thickened and red, and chemosis was present. A fistula appeared in the right lower lid, from which pus was secreted containing staphylococci. The left lower lid and also the tear sacs were swollen. The conjunctiva of both eyes were red and showed secretion, but the tear ducts were open. A few days later a symmetric fistula appeared in the left lower lid.

The third patient was admitted to the surgical clinic for swelling of the palate and alveolar process, with purulent discharge in the mouth and a fistula in the mucous membrane of the upper lid. The right eye protruded visibly; its mobility was apparently normal, but the vessels in the fundus were enlarged. The pupils were normal and equal, and reacted well to light. Tension was normal. After two days the protrusion was less, but the region of the right tear sac and lower lid and palpebral conjunctiva were swollen, and thickened and showed a mucous discharge, containing yellow staphylococci; as did also the discharge in the mouth. The tear ducts functioned normally. After some days all ocular manifestations had subsided, tho the purulent secretion from the maxillae still continued. This child also recovered.

Some thirty five cases are known in the literature. All writers consider this osteomyelitis of the maxillae to be caused by a bacterial infection. Pneumococci and streptococci appear oftener in the new born than in other people, in association with staphylo-

cocci. Careful bacterial investigation in the beginning is necessary. Most writers think that the entrance must be by the way of the alveolar process, following small superficial traumas. The inflammation continues in the spongiosa; usually soon followed by swelling of the lids, a fistula in the region of the tear sac, inflammation of the conjunctiva, purulent secretion from the nose, swelling and fistulisation of the alveolar process and palate, falling out of the undeveloped teeth and bony sequesters. The prognosis is usually favorable if there is early intervention, and the general condition is good. However, the death rate is still 25%. The treatment should be conservative for the ocular symptoms; no incision in the lower lid should be made even tho an abscess is forming, as the entire process is cured thru treatment of the palate and alveolar process, whereas from incision, a bad scar with ectropion may result. The conjunctivitis and swelling of the lids is due to a collateral edema. Exophthalmos was found in ten of the thirty-five cases; probably this is caused by simultaneous infection of the ethmoid cells.

Marx saw recently a six months old patient with osteomyelitis of the superior maxilla, which had not been recognized by the family physician and not treated. A fistula and contracted scar were present with ectropion of the lower lid.

Determination of the resistance of the Lacrimal Canal.

A. SONNEN and H. WEVE referred to Rochat's communication at the foregoing meeting. They used an .08 cm. thick and an .05 cm. wide, rubber tube, 1.7 mm. long, with a very fine cannula at one end; and at the other end a glass funnel. The entire tube is graduated in centimeters. The patient is seated on a low bench with the head back; and while the examiner passes the cannula into the lacrimal sac, an assistant raises the funnel, which was originally below the punctum, at a velocity of 25 cm. second. The patient is to indicate when the water enters the mouth or nose. When this occurs, the

funnel is slowly lowered, until the patient no longer feels the water. This process is then repeated. The heights above the lacrimal canal, to which the funnel has been raised, are recorded, with the subtraction of 5 cm. for the resistance of the manometer. Eighteen normal lacrimal ducts in twelve persons were examined. The apices of the first measurements were all below 45 cm. The second apex was as a rule lower than the first. Generally it was found to be zero, which shows that in certain cases it had a negative value. Entering the cannula only a few millimeters in the canaliculus, where conditions were normal, did not give a different reading. Where there was a difference, the apex, contrary to expectation, was higher when the cannula was introduced in the sac.

Thirty-five cases of dacryocystitis were examined; and all values for the apex were found from the upper limit of the normal to complete obstruction. However, a marked percentage of cases with a water pressure of 40 to 80 cm. was found and a similar percentage above 160 cm. The relatively light and rather severe cases predominate. In cases with a pressure above 160 cm., only a part of the passages could be syringed thru with Anel.

It was concluded that in normal conditions a "pump mechanism" overcomes a pressure of not more than 40 cm.; and in general a higher resistance provokes epiphora.

The cases of dacryocystitis without total stenosis distinguish themselves, according to our limited experience, not only by the degree of resistance but also by the often large discrepancies in the resistance. On one occasion when a patient complained of epiphora, and a first investigation rather pointed to a defective "pump mechanism" than a higher resistance, the pressure was repeatedly found to be higher during following measurements; and even an apparently patent canal was found to be impermeable on a following day. This condition was not observed in normal persons. In pathologic cases, an acute dacryocystitis was seen repeatedly to go over into a dacry-

ostenosis, while in normal persons disadvantages due to repeated measurements could never be observed. Sonnen and Weve therefore agree with Rochat that epiphora should not hastily be ascribed to a defective pump mechanism.

Two cases, in which the lower punctum did not open into the lacrimal sac, were cured in a few days after slitting the lacrimal canal inward for less than 2 mm. In one of these cases, the pressure for the normal eye was very low so that it seemed the pressure in the other, which was still below 45, might already be pathologic. However, this higher pressure can be explained by the accumulation of secretion or by secondary mucous membrane changes, which take place in a long unused duct. At the first measurement, there is an apparent higher resistance; but if with the following measurements the pressure is found to be normal, one may consider such cases due to a fault in the mechanism. However, some cases evade satisfactory explanation.

DISCUSSION.

H. K. de Hass observed, in contradiction to the above report, that the resistance was not measured, as resistance should be understood as a hydrodynamic magnitude. This is a consequence of fluid motion, in case the energy necessary for the maintenance of a regular current, which quantity of energy, changed into heat, is lost from the current proper. What is measured by the above method is a hydrostatic quantity which, far from being the consequence of fluid motion, can even become its cause. What is measured is the force (supposing the lacrimal canal had a narrow lumen over its entire length, entirely filled with fluid) necessary to push a meniscus out of the lower opening of the lacrimal canal. If the moist walls of this opening are close together, or if the nasal mucous membrane is dry, a high pressure will be necessary, apart from rigidity of the wall and sphincter action (first determination ; maximal pressure). With a wide or funnel shaped lower opening or with a moist nasal mucous membrane,

a low funnel height will be necessary to press out the meniscus. If the lower opening is below a fluid niveau, the capillary contrapressure is entirely removed (second determination; minimal pressure). In his publication, Rochat is mistaken in deducting 8 cm. capillary contrapressure, which he calls resistance, for during the measurements, the opening is pushed into the lacrimal canal, filled with fluid. The quantity which was measured by Rochat, Weve and Sonnen, was the capillary contrapressure at the lowest canal opening, sometimes connected with the pressure (when in the beginning not even a narrow lumen was present) necessary to press open the lumen against rigidity of the wall and sphincter action.

De Haas considered from the results that the capillary contrapressure plays a dominant role. Strictly speaking, the resistance could have been determined, if a certain quantity of fluid was pressed thru the lacrimal passage entirely filled (no air bubbles, that is different menisci) in a determined time under measured pressure.

Sonnen replied that this objection held good against the first but not against the second measurement.

Wibaut asked if it was not difficult to indicate when the current of the fluid stopped.

Van der Hoeve thought that the elasticity of the lacrimal sac was measured by the above method; this takes care of the continuance thru the lacrimal canal, for which the manometer does not teach anything.

Weve stated that the value of the results as regards the minimum resistance was not affected by de Haas' objections. Rochat told de Haas that he had never spoken of the resistance of the lacrimal canal, but of the pressure necessary to syringe fluid thru the lacrimal canal.

Retention of Artificial Eyes thru the Plastic Operation of Zeeman.

H. WEVE referred to Zeeman's communication to the Society some years before, in which he had described a method to facilitate the wearing of an

artificial eye when the conjunctival sac was small or the lower lid missing (also published in the K. M. f. A., Feb. 1911). He had had four similar cases. In two the conjunctival sac had been contracted for years, so that when the patient attempted to open the lids, a tense membrane was visible. No lower cul de sac existed, and an artificial eye had never been worn. The operation consisted of the cutting of a falx-like skin bridge, where the fornix of the lower cul de sac should be. The lower incision divided only the epidermis, while the upper penetrated to the conjunctiva. The skin bridge was turned inside and served as a fornix; it was sutured to the conjunctiva destined for the surface of the lower lid. If not enough conjunctiva was present, the surface of the wound had to be covered with Thiersch grafts. A small artificial eye, previously selected, was used as a prosthesis; and the lids were temporarily sutured. For a few months in both cases, small abscesses appeared at the line of incision, retarding the cure. In future, Weve would prevent the lower lid from becoming too thick; a partial tarsus extirpation may be valuable.

DISCUSSION. Prof. Snellen often used a flap of skin of greater height, which he introduced from the cheek into the conjunctival sac. He remedied the defect in the cheek by a flap from the nose.

Roelofs also had difficulty because the lower lid became too thick. Altho the space was large enough, he could not find an artificial eye that would fit properly; so he made a cast of wax, as plaster was unsatisfactory. The eye made from this cast fitted.

Zeeman stated that the fistulisation of the lower skin wound could be prevented by making the incision not too shallow. Likewise the lower lid would not present difficulties, if the conjunctival flap were sufficiently free, and the place for the fornix were chosen accurately.

In a patient with the globe enucleated following a severe burn, Visser transplanted a flap from the temporal region inward thru an opening in the

lid. He then performed the operation of Zeeman and stretched the orbital cavity, which was still somewhat small, by means of discs. These were made by the patient himself, who worked in a brass foundry, after models of crown composition, shaped by hand and renewed weekly. After eight changes in the discs, an ordinary artificial eye could be worn.

Angiomatosis of the Retina.

On August 14, 1919, J. H. A. T. TRESLING examined a factory employee, 27 years old, at the Groningen clinic. He stated that a week previously a drop of lime water had fallen into his left eye, since which he could not see well. The eye had not been inflamed or painful. In 1916, this patient had been treated in the rhinologic clinic for an obstruction of the nose and for dizziness. The vision in both eyes was normal and the fundus was normal. Both then and at the present examination he suffered from headache over the left eye. Externally there was nothing abnormal; the pupils reacted, the media were clear. Vision equal 2/60 f. The papillary borders were somewhat hazy. Around the disc and in the macular region, there were numerous small white foci and fresh hemorrhages. The vessels on the disc were normal. At one point, two vessels, distinctly recognizable as an artery and a vein, increased gradually in circumference and began to show marked tortuosity; the enlargement and tortuosity reaching their maximum, as they disappeared in a red knot to the temporal side. This was rather sharply limited, and light red in color. The vessels could be traced inside it. Its size was double that of the disc and its shape that of an escutcheon. In the upper part of the fundus was another knot, kidney shaped and somewhat smaller and redder than the first. From the further side of both knots, small vessels emerged. Both knots were from 8 to 9 D. in size. They were without pulsations and made no pressure on the eye, tho both the vein and the artery pulsated distinctly. The visual field was contracted concentrically to 50 and 60 degrees, with an

absolute central scotoma of $\frac{3}{4}$ degrees. The right eye was entirely normal.

A month later, the vascular enlargement and tortuosity had increased; the retinal foci had extended; and in the macular region, an extensive star figure had formed. The vessels below, at their entrance to the knot, were still clearly visible; and a communication between the vein and artery was seen in the form of a few small vessels, just as in the case of Ditroi, showing that these knots were of similar formation.

In the further progress of the disease, the lateral side of the larger knot became broader, and one small arterial branch became larger and more tortuous. In this branch, which was one of those entering the knot, various dark colored, knob shaped intumescences appeared, resembling the nodi of a blade of grass. Fuchs first described such a case in 1882 as an aneurysma arteriovenosum. This diagnosis has later been contradicted. The six cases which have been examined anatomically adhere more closely to von Hippel's view than to any other. The changes result from a pathologic degeneration, a telangiectasia of the retina, originating in a malformation, which also provokes a proliferation of the other tissue elements in a greater or less degree. In its course, the circulatory disturbances produce a necrosis of the tissue of the retina, which is clinically and pathologically identical with the changes found in exudative retinitis. The final result is a complete retinal detachment, often accompanied by iridocyclitis and high tension, which indicate enucleation.

On one occasion the disease was found in two members of the same family, which might indicate a familial origin. Tresling made a similar observation, as later a brother of his patient came for treatment for the same condition in the same eye. A third brother had choked discs in both eyes but no angioma could be seen.

The Etiology of Concomitant Strabismus.

G. TEN DOESSCHATE stated that the text books referred to paralytic strabis-

mus and concomitant strabismus as two distinctly different conditions, the cases of paralytic strabismus of long standing may on rare occasions appear to be concomitant. In contradiction to this general opinion, Prof. Snellen published as his opinion that convergent concomitant strabismus can be caused by abducens paralysis of one or both sides, paresis with consecutive increase of tonus of one or both interni muscles. Snellen did not deny that anomalies of refraction may resemble strabismus, but it is a mistake to believe that these of themselves will produce it. Seven objections to Donders' theory were enumerated. The speaker had examined many cases to see if he could verify Snellen's hypothesis.

In paralytic strabismus, the angle of deviation should not be the same, when the eye is turned in different directions. Ordinarily, double images and failure of orientation occur, and the secondary deviation is larger than the primary. In concomitant strabismus the size of the angle of deviation should be constant; double images do not occur and secondary deviations are equal.

Ten Doesschate's investigation showed that the difference between paralytic and concomitant strabismus was not very distinct and that in most cases of concomitant strabismus some qualities of paralytic strabismus were present.

He gave an account of his findings with regard to the fields of fixation in the horizontal meridian for divergent and convergent strabismus and from them concluded that compared with the normal, the field of fixation in convergent squint was somewhat enlarged toward the nasal side and constricted toward the temporal side, especially in the deviating eye; while the reverse was true for divergent squint. In examination of the normal field of fixation, the possibility of paresis could not be excluded. When the apparently normal eye turned out as far as possible, nystagmoid motions were observed, which might be caused by muscular paresis; these conditions occurred

for the most part in the young, whose strabismus was of recent date. If the results of the investigation of the fields of fixation did not demonstrate that muscular paralysis was always the cause, they at least indicated the presence of paresis.

In most cases of concomitant strabismus, the primary and secondary strabismic angles, contrary to general opinion, were not alike, altho the difference is sometimes quite small. Likewise in indurated cases of paralytic strabismus, only very small differences between the two angles could be found. It, therefore, could not be deduced from the presence or absence of a difference in size between the primary and secondary strabismic angles, whether or not a given case belonged to the paralytic or concomitant type.

Snellen pointed out that the strabismic angle in concomitant strabismus was not stable for the different directions of fixation. The speaker had observed this repeatedly. It was especially distinct in small children, who had squinted for a short time only.

In some cases of squint, the strabismic angle was fairly stable for the different directions of fixation, but this did not prove that they were not cases of paralytic squint. Cases were known, which beginning as paralytic strabismus, had yet shown a stable angle of deviation. This proved that one cannot deduce from the presence or absence of stability of the strabismic angle, whether the strabismus is paralytic or concomitant.

The manner, in which patients who squint look at objects, varies greatly; and it is not possible to base on this point a sharp distinction between paralytic and concomitant strabismus. The rule, that with paralytic strabismus the patient sees double images and with concomitant strabismus single images, is not universal. The double images in strabismus of long standing may disappear. There have been patients with paralytic strabismus who never suffered from double vision. On the other hand cases of concomitant strabismus were observed, who were constantly troubled by double vision. These were,

in general, patients with good vision in each eye and a small strabismic angle. In them, the uniting of the images is mostly prevented by paralysis of an oblique muscle. During the onset of strabismus, double images are observed much oftener than is usually mentioned. This is true even in young children. The presence or absence of double images is therefore no general criterion for the differentiation between the two kinds of strabismus.

As the patient sometimes observes the two images, which are formed on the foveae, at the same time and about at their true mutual distance, the condition can be very disturbing. Also a kind of binocular vision can exist with strabismus, probably thru the displacement of the normal retinal correspondence. It is known that patients with paralytic strabismus often have difficulty because of their defective orientation. However, in concomitant strabismus also, very peculiar localization disturbances are observed. In examining these cases, not enough effort is made to discover whether these disturbances are stable in different directions of fixation. In concomitant strabismus, the speaker had examined each eye separately to determine its localization in the different parts of the field.

In another test the patient's chin was placed on a horizontal board, connected with a vertical one. This prevented him from controlling the motion of his arm. On the vertical board were lines, which the patient was to continue beneath the horizontal board. The results varied greatly. One group of patients localized well with each eye separately. They had alternating strabismus with an almost stable strabismic angle. A second group localized well with the eye usually used in fixing objects, but hesitatingly and incorrectly with the deviating eye. This occurred for the most part in unilateral strabismus with poor vision in the squinting eye. A third group were those who made almost the same error with the deviating eye over the entire field of fixation. With divergent strabismus the patient pointed too much to the nasal side and conversely. In the

fourth group, there was a difficulty of localization which resembled the beginning of paralytic strabismus. Especially in the temporal half of the field of the deviating eye, the patients pointed too much toward the nasal side. In divergent strabismus, the reverse was true. In one case a patient with his left eye in the left half of the field pointed too much toward the left, and conversely in the right half of the field with the right eye (as one would expect with bilateral abducens paresis).

It could be proven that in all these cases the pointing was a true optic phenomenon. If the patient closed both eyes and touched the index finger of the examiner with his own index finger, he could always touch the finger of the examiner again, after that finger had been lowered perpendicularly. The disturbances of localization do not differ in paralytic and concomitant strabismus. That all patients with concomitant strabismus do not localize incorrectly does not disprove a paretic origin, for in paralytic strabismus good localization in both eyes may exist.

It appears from the foregoing that in many cases of concomitant strabismus, most of the peculiarities of paralytic strabismus are present. Since many cases of squint, which started with paresis, gradually display a true concomitant type, and since all possible degrees between the two forms appear; a formal division between the two should in general be given up and the cause of the one disease should be accepted as a cause of the other also.

The speaker found eleven cases of convergent to two of divergent strabismus. Fifty-four percent were hypermetropes without astigmatism. Many patients have hypermetropia when the squint develops, who later have emmetropia or myopia. There were twenty with abducens paralysis to seven with oculomotor paralysis. The speaker mentioned five points against the influence of amblyopia ex anopsia. Snellen considered poor vision of secondary importance in the development of strabismus. Amblyopia may influence the development of a primary or secondary

deviation. It depends upon whether the paralytic eye is the amblyopic or the good eye. Cases of slight paresis, where latent strabismus is present, may become manifest and there may be a tendency to loss of vision, when one eye is injured. Cases of hypermetropia with poor vision in either eye, but without squint, have been observed; and they prove that such a condition is not sufficient cause for strabismus.

Snellen's theory, therefore, explains the cases of convergent squint which Donders' theory failed to explain; they are to be considered cases of paralytic squint of long standing, accompanied by consecutive contraction of the antagonist of the paralyzed muscle. Ten Doeschate explains in the same way cases of external squint, in which other factors also may have entered, such as diminished mobility of the globe, a possible divergent position of rest and a small angle of deviation.

The few cases of sursum and deorsum strabismus have the same indications.

DISCUSSION. Snellen said that according to his experience, convergent concomitant strabismus nearly always resulted from paresis of the abducens nerve, which was usually bilateral; and the hypermetropia could only be overcome thru the cooperation of both eyes, and in conjunction herewith the tendency for accommodation and convergence alone can influence the relative position of the eyes, according to Donders' theory.

He showed photographs to illustrate this. 1. Two new cases, one of Uthhoff's and one of his own, of bilateral total paralysis of the abducens, where neurologically no other deviation could be found. The case showed all the ear marks of concomitant strabismus, altho not the least doubt existed as to the paralytic origin. In the other eye, the strabismic angle was the same for the different directions of fixation, when fixing with either eye; and there was no double vision. 2. Photographs of unilateral abducens paresis, giving the full picture of concomitant strabismus. 3. Photographs which showed that with bilateral abducens paralysis but without hypermetropia, a marked

convergent strabismus appears with fixation to the left or right; but there was no or only slight deviation in looking forward.

Van der Hoeve asked whether ten Doeschate would explain divergent strabismus thru paralysis of the interni; this is rather strange as it is always a question of a branch of the oculomotor, which is difficult to localize. Ten Doeschate accepts it but agreed that other conditions must be present.

Roelofs agreed that Donders' theory is insufficient and mentioned that Worth and Bielschowski had directed attention to underdeveloped binocular vision. The new theory, Snellen-ten Doeschate, is possible, but its probability is yet to be demonstrated. Granted that sometimes after undoubted muscular paralysis, a condition appears which altogether suggests concomitant strabismus, this is quite rare and happens a long time after the onset of paralysis. This onset is very different. The symptoms of recent abducens paralysis, even in young children, are totally different from those of a developing convergent, concomitant strabismus, with its changeable character. The speaker observed more than once a bilateral abducens paresis in adults, but every resemblance to concomitant strabismus was excluded. Also the demonstration of double images with Maddox rod was for the most part very difficult, or impossible in concomitant strabismus. It was much easier in many cases of paralysis in children, partly from hereditary lues. The restriction of abduction in convergent, concomitant strabismus cannot be taken as a proof of a paresis. These are the secondary habitual changes, which play so important a role in orthopedics.

Snellen replied that his explanation was not merely an hypothesis, but rested upon facts and data which he had observed continually in hundreds of cases of concomitant strabismus, and which were confirmed by these investigations of ten Doeschate.

Visual Disturbances with Mucocele of the Posterior Nasal Sinuses.

VAN DER HOEVE spoke of the rarity of mucocele of the sphenoid. Mucocele

(hydrops) is according to Hajek in rhinology an accumulation of mucous fluid free from pus in a cavity limited by bony walls, where thru closure of the opening, pressure upon and dilation of the walls occur.

Miss X., 51 years old, consulted an ophthalmologist in 1912. The vision in both eyes with correction was 7/10. On September 28, 1914, she returned with only 4/60 in the left eye and slight changes in the macula. A few days later the disc became pale. Under treatment it improved to 6/15 and the papilla became whiter. Then vision again decreased; and on January 9, 1915, the left eye was blind and the disc atrophic with complete oculomotor paresis of the left side. The right eye was also affected, vision being 6/18 on January 16, 1915. Under sublimat pills, the vision of the right increased to 6/12; L. remained blind, but the paresis improved.

In July, 1917, the vision was R. 8/10, L. 0. The left eye showed an exophthalmos of 6 mm. with an external deviation of 30 degrees. There was ptosis, all motions were restricted, and the disc was atrophic. In the right eye the fundus was normal, but there were slight peripheral lens opacities. In 1918, the patient suffered from severe headache, especially on the left side, extending into the back of the head. A soft pillow felt like a hard board. She returned in April, 1919, with pain in the left eye and diminished vision in the right, 5/10. The disc was very red, the field of vision normal, and tension 27 mm., 30 mm. Schiötz. On June 20, a relative central scotoma was found for red and green, of about one or two degrees. A diagnosis of tumor, probably in the neighborhood of the chiasm, was made.

On July 10, 1919, the patient was admitted to the hospital. Vision was R. 0, ptosis was present and exophthalmos of about 7 mm. The papilla was atrophic and the veins dark. Mobility was restricted upward, outward and inward. After incision, going in with the finger, no tumor was palpable in the orbit, and there were no pulsations. The vision R. was 5/10; the disc was

very hyperemic, the veins thick and dark colored, and the arteries thin. There was pain above the left eye, radiating along the infraorbital nerve. In the nose and its cavities there was nothing abnormal. An X-ray showed a light shadow deep in the orbit, perhaps localized in the ethmoid; the sphenoid antrum seemed large, its roof not distinct, and the dorsum epiphysis strongly bent backward. Its cavity was clear. Passing the finger up to the optic foramen, a strongly prominent bony wall was felt at the inner side of the orbit, which was not thin. It was not a circumscribed tumor but suggested the bulging wall of one of the posterior cavities. A diagnosis of probable pneumatocele was made. The operation had unexpected good result: the pain disappeared; vision increased to 7/10; and after disappearance of a long continued edema of the lids, the proptosis had receded to 4 mm. The stasis in the right eye had disappeared.

A couple of months later, she began to complain again of the right eye. The disc was red again and the veins thick and dark. Vision had diminished to 5/10. Altho repeated examination did not reveal anything abnormal, the left posterior cavity was opened. As soon as the ethmoid was opened, after removal of the entire normal concha media, a greenish brown, thready, inodorous fluid appeared, 40 to 50 cm. in amount, containing mucus, some leucocytes, many cholesterol crystals and a few red blood corpuscles, but no microbes. The next day, vision had increased to 8/10; the temperature rose to 40 degrees, and sondage of the cavity evacuated most probably cerebrospinal fluid. At the last examination, November 21st, vision was R. 7/10, L. 0. The visual field was nearly normal; there was no central scotoma, and the ocular movements were good. The patient felt well.

This was a case of mucocele of the sphenoid and ethmoid of the left side, where the roof of the sphenoid and the wall between the ethmoid and sphenoid were entirely or partially absorbed so that the probe thru the sphenoid sinus reached the dura mater. It could not

be definitely determined whether the right cavities were enlarged. It is possible that both optic nerves had become affected by the distended left cavities.

Van der Hoeve gave a list of the eight cases known in the literature. It does not seem improbable that the closure of the sphenoid cavity is connected with the ossification of the walls, which is completed about the age of twelve. In seven of the nine cases, the primary symptoms appeared in the second decade. The condition belongs, therefore, to the developmental malformations. The prognosis is favorable for life but very unfavorable for the eye. In the nine cases known, nine eyes became blind. Three patients were seriously ill, and in two cases no report was made. The diagnosis is very difficult; no case was diagnosed correctly before operation. In one case it was considered an inoperable sarcoma capitis, in other cases tumor. Roentgen examination is insufficient, probably on account of the thinness of the bones. The frequency of the disease, therefore, cannot be judged.

As it has been shown that a very important affection of the nasal cavities, with serious ocular complications, may remain entirely undetected, it is wise in all cases of affection of the optic nerve without apparent cause to open the cavities, especially if proptosis is present. This is true not only for mucocele but also for empyema. H. Snellen Jr. advocated this 25 years ago.

DISCUSSION. Waardenburg asked whether, when exophthalmos and headache were absent and there was only a central scotoma, this condition might exist; and whether the opening of the cavities could be considered a harmless intervention.

Van der Hoeve wished to remind the unwilling rhinologist of these cases of mucocele. He considered the intervention harmless. If the mucous membrane were not scraped away, the optic nerve, which sometimes crosses the cavity, could not be damaged.

De Kleijn warned against too aggressive measures: mucocele is a rare condition. The Roentgen examination can

be relied upon, as the experience of recent years has taught him; if the photographs are taken in different directions and are negative, the cavities are not affected.

Van der Hoeve did not always find roentgenographs so reliable that cavity affections could be excluded with certainty, and if the mucocele was rare, inflammations of the cavities were manifold.

Testing of Dark Adaptation.

W. P. C. ZEEMAN and C. OTTO ROELOFS referred to the role which this examination had recently assumed in the clinic. It is important to discover whether this test can be made accurately or whether a certain margin must be allowed to explain the disturbances of adaptation eventually discovered. They studied the connection between disturbances of the field of vision and adaptation, because from this side difficulties could be expected. Considering the light sensibility of different retinal zones, the influence of the size of the field and the differences in sensibility in different parts of the visual field during dark adaptation are apparent.

During adaptation to strong illumination, the fovea is more sensitive than the periphery (Vaughan and Boltznow). When the eye has to be adapted to the dark during an hour, the increase in sensibility at the center can be estimated at 20, while the peripheral sensibility can be increased 5,000 to 10,000 times. On account of this irregular increase in the sensibility for light, the distribution of sensibility in the field of vision of the eye in dark adaptation is totally different from that in light adaptation. The fovea is relatively less sensitive, while the sensibility increases rapidly toward the periphery and reaches its climax at about 18 degrees from the center. This must reveal peculiar consequences, when the course of the dark adaptation is examined. In the beginning, the sensibility of the fovea is measured; later that of the periphery. If there is a central scotoma, the greatest sensibility will be found at the periphery of the field in light adaptation, which is much

below that of the normal eye in the same circumstances. After some dark adaptation, the sensibility will increase to normal. The adaptation curve begins, therefore, with a low sensibility and rises to the old height. Apparently an increased adaptation is present.

Totally different is the curve with a constriction of the visual field. The first part of the curve does not differ much from the normal; but after dark adaptation, these same retinal parts determine the sensibility. The highest value, to which the adaptation can increase, is only at the foveal region; and that cannot be as high as in normal circumstances. This is apparently an important disturbance of adaptation, even tho the parts of the retina and optic nerve, which function, are entirely normal.

In a similar way, changes of the adaptation curve with different forms of constriction of the visual field can be deducted and verified thru experimentation. An investigation was made of the influence of different light fields, after the eye had looked for ten minutes at a strongly illuminated white sheet of paper. Then the threshold values, after one minute and every three successive minutes, were plotted. A direct relation between the size of the object, the form of the visual field, and the course of the adaptation, respectively, was found. One must be very careful in making conclusions from the course of an adaptation curve with regard to the essence of the adaptation itself.

This has a practical bearing. Lately Behr and Iggersheimer stated that this investigation could give important data as regards the diagnosis of neuritis and atrophy of the optic nerve, and of cerebral complications. If their case histories were studied with knowledge of the facts found in this investigation, one would not hesitate to reject many of their conclusions as rash and mistaken. Repeatedly, one encounters observations, which are explained thru these experiments: Two illustrations were given.

DISCUSSION. Marx could not accept the supposition that fixation was so un-

certain, as an investigation had shown him that even with peripheric objects, the correctness of fixation was fairly good.

Zeeman replied: To have supposed a displacement of the fixation point with these very weak sideways light foci, can very well accompany a great stability with regard to the accuracy of the fixation of the laterally situated point.

The Influence of Ultraviolet Light.

G. B. J. KEINER mentioned that Widmark in 1893 was the first to experiment with ultraviolet light; and that not many new facts had been added since Birch-Hirschfeld gave us the first results of the new staining methods. Tho they agree at many points, there are numerous contradictions. A certain capriciousness, as regards the influence of the rays on the eye, cannot be gainsaid. Nearly every successive investigator discovers a new phenomenon and only partially verifies the earlier results. Keiner referred to Hertel's experiments with the mercury cadmium lamp in 1903.

A rational ray therapy depends on the spectrographically demonstrated transmission of the rays thru the human ocular media. On account of the great variations already observed, many further observations are necessary. Ultraviolet rays have often been used therapeutically. The previous year, Therexe Chotzen and Kurnitzky treated nine patients with the Kromayer lamp, after having made experiments on rabbits. In two cases, a tenacious bulbar and dendritic keratitis, following the treatment, were observed and severe pain was frequent, from which one might surmise that the spectrum of this lamp contained a rather large number of rays of small wave length. Strange to say, Chotzen and Kurnitzky considered the depigmentation of the iris, which they observed at first, harmless.

Keiner described the experiments of Widmark, Ogneff, Hess and Birch-Hirschfeld with the arc lamp, the uvio lamp of Schott and the dermo lamp of Finsen, respectively, and their microscopic findings. He, himself, made ex-

periments with the quartz lamp of Hereus, a mercury vapor lamp with a large and intensive ultraviolet spectrum which is well known. The focus of the rays, collected thru a lens of 24 D., fell in the iris plane of a rabbit's eye. The exposure lasted from five minutes to an hour and a half with a current of 2.5 to 4. amperes. Neither a blepharostat nor cocaine were used. There was no appreciable heat production. A glass plate, 3 mm. thick, which transmitted the waves of 313μ and higher, stopped entirely the action of the rays of shorter wave length. A current of at least 3.5 amperes is necessary to produce changes in the eye. The action of the rays also depends on the length of exposure.

The clinical picture of the eye exposed to rays was constant; the severity of the phenomena alone changed. Directly after the exposure to the rays, a defect in the epithelium of the cornea, strongly staining with fluorescein, appeared. Usually there was edema of the exposed conjunctiva and epiphora. On the next day there were marked swellings of the lids and chemosis of the conjunctiva with mucopurulent secretion. The cornea was dull, the surface looked as if small blebs were present, the pupils reacted narrowly.

In from three to five days, the normal condition was reestablished. With the decrease of the conjunctivitis, however, the corneal process usually extended; and the iris showed further symptoms of irritation. The defect in the epithelium extended over the entire rayed part and was sharply demarcated from the normal, which had not been exposed. The capacity extended in depth; and after a few days, the cornea had become opaque with a marked swelling of the diseased part. Ulcers appeared, which extended in depth and in breadth. There was deep ciliary injection. The iris was sometimes, even in twelve hours, distinctly swollen and hyperemic, but reacted well for the first two days. Its design then became cloudy and the reaction to light and atropin was very slow. The aqueous humor was by this time slightly turbid. Lens and fundus did

not show changes. At the end of the first week, the corneal symptoms were clearing; vascularization was present, and the infiltration became slowly thinner. At an average of the sixth day, a distinct depigmentation in the iris, where the lamp image had fallen, became noticeable. This first began after five minutes of the rays with 3.5 to 4. amperes current. In all animals exposed to the rays for ten minutes or longer, the cornea did not clear up; a more or less opaque macula remained. An individual difference in sensitivity of the animals for the ultraviolet rays was noted.

Microscopy of the changes showed that the epithelium in the acute stage had here and there formed blebs; in other spots it was necrotic or exfoliated. The stroma was much swollen, and there was faint staining of the nuclei. An infiltration with polynuclear cells was found. Descemet's membrane and the endothelium were normal. After more severe exposure, when the stroma cell nuclei did not stain, the endothelium showed desquamation, while Descemet's membrane was still normal. Then the condition was nearly complete necrosis of the entire cornea. The aqueous humor was strongly albuminous with fibrin threads in the coagulated mass. The swollen hyperemic iris showed necrosis of its elements; cell nuclei did not stain at all or only faintly. In that region the pigmented cells began to lose their extension and shrink to round black nodules. Thus the normal, strongly pigmented margin of a darkly pigmented rabbit slowly disappeared. The posterior pigment layer had grown to the lens capsule in different places. In later stages, nearly all chromatophores became degenerated, and the iris tissue replaced by connective tissue.

In the posterior chamber, a fine fibrinous net with some leucocytes appeared, and also between the ciliary processes. However, the lens and retina in the aphakic eye remained normal.

The variations from Birch-Hirschfeld's findings must be explained thru

a difference in intensity in distinct parts of the spectra of the lamps. The rabbit's cornea begins to transmit rays at $296\mu\mu$. The lens transmits rays of $365\mu\mu$ and larger; it blocks an important part of the rays which have passed the cornea. Very few of the ultraviolet rays of the Hereus lamp, therefore, reach the rabbit's retina. The rays, which produce the depigmentation of the iris, must have a wave length of $296\mu\mu$ and larger. The rays between 296 and $365\mu\mu$, which are dangerous to the lens, are rather few in the lamp spectrum.

The ultraviolet spectra of three light foci were demonstrated, showing the difference in intensity in the different parts of the spectrum.

Detachment of the Retina thru Indirect Traumatism.

H. F. DUBOIS referred to a case Rochat presented at the fiftieth meeting, of detachment occurring some time after a fall on the back of the head. In the discussion, many did not agree with Rochat's belief that an indirect traumatism could produce detachment. Dubois has observed a case in which detachment was found directly following an indirect traumatism (fall on the back of the head). A boy of seventeen fell on the back of his head while playing football; and a few hours later, he noticed that the upper part of his visual field seemed covered with a curtain. An oculist diagnosed the condition as detachment. On the fifth day the boy came under Dubois' care. Vision was 2/60, fingers; and there was a detachment of the lower part of the retina but no rupture.

There is no mention in the literature of traumatisms, which do not directly touch the globe or its immediate surroundings.

DISCUSSION. Cuperus observed a few years ago a case of detachment, which was similar to that of Dubois. A railway worker, and therefore a person with normal eyes, fell hitting the back of his head on a rail. He was unconscious, and a few days later had a detachment of the retina without rupture. The eye later became blind from total detachment.

Tarsorrhaphy.

H. F. DUBOIS believes more attention should be paid to this operation, which is described everywhere but seldom practiced. In examining the statistics of the different clinics for the last twelve years, he found it mentioned a few times in those of Groningen only. He has performed the operation nine times on eight patients, and is well satisfied with it. When there is a permanent diseased condition, the cause of which cannot be removed, the aperture cannot be closed permanently; and tarsorrhaphy at one of the angles serves very well. In lagophthalmus which cannot be remedied, the shortening of the aperture between the lids will lessen the uncovered portion; and the lids will adapt themselves better to the globe so that the eye closes more successfully. The operation is preventive. It will also influence favorably a chronic inflammation of the conjunctivae, which are too much exposed to the air; and we will have a cosmetic effect. The two most important indications for this operation are paralytic ectropium from incurable facial paralysis and the exophthalmos of Graves' disease. Dubois operates under local anesthesia, following the method of Fuchs. After the operation, patients with facial paralysis can close their eyes somewhat better; the paralytic ectropium disappears almost entirely; the aperture is much smaller, the tears less and the cosmetic result good. The "staring" in Graves' disease is much less.

DISCUSSION. Faber thought prolapsus bulbi should be added to the indications for tarsorrhaphy. In a patient with Graves' disease and high myopia, who had developed prolapsus bulbi, he closed the aperture for about 1.5 cm. at the temporal side. In order to make the closure firm, he slit the upper and lower lids and sutured the separate parts together.

Heterochromia with Paralysis of the Sympathetic.

P. J. WAARDENBURG found in the literature that according to many writers, heterochromia exists with unilateral sympathetic affection. This sympa-

thetic heterochromia must be sharply distinguished from heterochromia with cataract, descemetitis and vitreous opacities (von Herrenschwand). Yet, sympathetic heterochromia does not need to be distinguished from heterochromia with other changes (Scalinci, Streiff). Sympathetic paresis seldom produces trophic disturbances of the eye (Streiff). The sympathetic influences the eye only in the first years of life (von Herrenschwand). Sympathetic heterochromia occurs very rarely in some regions, for example in Holland (Mas Soewarno).

Waardenburg has observed up to the present time seventy-three cases of uneven color of the iris; thirty-seven were of partial heterochromia, known as iris bicolor; five were unilateral melanosis, where the color difference was due to increased pigmentation of one eye. Of the other thirty-one cases of complete heterochromia, eight light colored eyes showed no other anomalies; in six others congenital anomalies were found (persistent hyaloid artery, colobomata, persistent pupillary membrane and cataract). In two tabes were present and in the other seven, sympathetic paresis. Of these seven, the descriptions follow. In them the cocaine experiment was positive, and once the adrenalin experiment gave a positive result. In four, the complex symptoms of Horner were present. In three, there were narrowing of the pupil and of the palpebral fissure. In three, there were sweating and blushing on one side only; and in one case a distinct hemiatrophy of the right side was visible. One man and six women were affected; and the sympathetic effect appeared four times on the right and three times on the left side. In all cases, trophic disturbances in the iris were found; the stroma was thinned, the color paler and diminished. In the fundi, no distinct pigment or vascular changes could be noted.

The trophic disturbances are due to sympathetic paresis and may originate at any age. Sympathetic paresis, which originates at birth or in the earliest years, produces a hypoplasia of the iris

stroma, especially of the anterior layer and the pigment. In severe cases, it may cause a pigment aplasia and later a dystrophy of the normal stroma and a loss of pigment. The function of all of these eyes was normal. Is it possible that the trophic disturbances may be indirectly due to loss of or diminished function of the iris? A slight bleaching of the iris can be expected in cases of oculomotor paralysis.

Waardenburg saw this twice, once in a congenital case, and once with tabes. In an addendum, reference is made to Calhoun's article on this subject.

DISCUSSION. In 50,000 school children, Wibaut found two cases of heterochromia, one of which was sympathetic. This investigation, however, proves nothing with regard to slight cases. Zeeman recently saw a patient with extensive angiomatous changes on one side of the face and neck, enophthalmus, a small globe with strongly pigmented iris, and persistent pupillary membrane, indicating a less progressive development; resorption in the region of the anterior chamber conformed to the observations of the speaker.

ROYAL SOCIETY OF MEDICINE.
SECTION ON OPHTHALMOLOGY.

June 10, 1921.

MR. W. T. HOLMES SPICER, occupying
the chair.

A Speculum to Prevent Pressure on
Globe.

DR. WALLACE HENRY demonstrated a speculum which he had devised for the purpose of preventing a patient pressing his eyelids together after an opening had been made surgically. He said that since he started using it, at the beginning of the year, he had had no loss of vitreous. He was accustomed to leave the speculum in position until the lens extraction and the toilet was finished.

A Desk for Myopic Children.

MR. FRANK MOXON showed a desk for use with myopic children or those

who, on account of the close application of the eyes to the task in hand, were liable to become myopic. The eyes were kept at a minimum distance by means of plate glass, under which the child did his writing.

Acute Macular Disease.

MR. R. D. BATTEN spoke of the desirability of a better knowledge of diseases of the macula; cases frequently occurred in which macular changes were the only evidence of disease and the cause of failure of sight, unassociated with other forms of retinitis. There was a great discrepancy between the physical signs, as shown by the ophthalmoscope, and the symptoms. Much depended, for a recognition of the physical changes in the macula, on the light. When a really efficient light was available, fine pigment changes which now escaped observation would be detected. Finer changes in the macula could be better seen by looking to one side rather than straight at the macula. The two acute cases he now showed were not unlike the family group in respect to the fundus changes; this familial group must be kept in view in investigating macular changes, otherwise the explanation of the fundus change might be missed. Familial amaurotic idiocy was allied to that which was racial in origin, and both forms might be due to the same toxin. The nature of the toxin was not yet known; in his cases causes at work included pyorrhea, suppuration of nasal sinuses, gonorrhea, influenza and other illnesses, and pregnancy.

Changes in the Fundi in Three Brothers.

MR. McMULLEN'S cases all had fundus changes, of different character, but having one feature in common, viz., the development of abnormal connective tissue, either on the surface of the retina or the vitreous. Of the possible causes, he favored the view that they followed intraocular hemorrhages. He regarded the cases, in fact, as atypical retinitis proliferans. These three brothers were members of a family of 13 children—9 boys, 4 girls. Three of the boys died between 2½ and 5 years of

age, and of the 6 surviving boys, 4 had defective sight.

Macular Changes.

MR. G. W. ROLL'S case had a circular plaque of what seemed to be organized fibrous tissue of the macula, the changes being symmetric in each eye. Sight failure had been complained of 7 years, especially during the last two years. The field of vision for white and red was practically normal, but yellow and green were scarcely perceived at all. The only history which at all pointed to traumatism was proximity to a falling bomb. The appearance was not unlike that in the Tay-Sachs cases, tho these latter were confined to infants, and to the Jewish race. In one eye there was a hole thru the plaque of fibrous tissue.

DISCUSSION. Mr. Herbert Fisher discussing the foregoing cases, thought such a mass of organized fibrous tissue could only have been produced by some lesion, presumably toxic, of an irritative character. He did not know whether there was antecedent hemorrhage. He did not think there was a resemblance to the Tay-Sachs disease in Mr. Roll's case. He agreed with Mr. McMullen's view of the case that gentleman showed. The macula might show an extreme vulnerability to toxic causes, and in some of the cases there might be macular change having such an origin without peripheral change, tho in some there was choroido-retinitis.

MR. R. R. CRUISE mentioned a case similar to Mr. Roll's, which had been under his observation ten years. The condition began with a quiet looking edema of the macula, and went on to a state very similar to that in the present case. The sight was less than 6/60, and a similar process developed in the other eye. There was first a slight stippling of the macula, then edema, and later a pale looking area developed, and that was now quite pigmented over. If first seen now, it would give the impression of owning a hematogenous origin. He believed cicatrization had now set in. There was some likelihood of the patient being tuber-

culous; there was no more definite toxic history. He had had two similar cases in private since the war, and from them Mr. Matthews obtained the dysentery bacillus and the paratyphoid. They improved very much on treatment with vaccine.

Atrophic Iris.

Miss Mann showed an atrophic iris in a patient, the affected area being a sector which went up and out and down and in. At 3 weeks of age the child had small-pox, and blindness had existed in that eye as long as could be remembered.

Mr. J. H. Parsons, F.R.S., commented on the occasional absence of uveal pigment from the iris which was not revealed by ordinary examinations, hence it might occur more frequently than was usually supposed.

Cyst of Moll's Gland.

Mr. M. S. Mayou showed a patient with an unusually large cyst of Moll's gland.

H. DICKINSON.

THE OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES.

May 4, 1921.

Retinitis Pigmentosa.

DR. F. J. BLAXLAND presented C. H., age 11 years, who was first seen 13 months ago complaining of defective vision. On examination large and small patches of choroiditis (some taking the form of spider like particles) were seen following the course of the vessels and at the periphery. The discs were rather pale. Should the diagnosis be disseminated choroiditis or retinitis pigmentosa? There was no family history of retinitis pigmentosa.

The consensus of opinion was that it was retinitis pigmentosa and it was suggested that a trephining operation might possibly delay the deterioration of vision.

Interstitial Keratitis.

DR. F. J. BLAXLAND showed Miss A. H., age, 17½ years, first seen at St. Vincent's Hospital three years ago, when she had an attack of interstitial keratitis in her left eye. Tubercular and Wassermann tests were negative and the family history was good.

Two months ago she got an attack of acute interstitial keratitis in her right eye. Bordet test was negative. A large dental abscess was found under two crowned teeth but as this had not been in existence at the time of the first attack the question arose as to what was the cause of the keratitis?

Paralysis of the Inferior Rectus.

DR. F. J. BLAXLAND: C. B., age, 11 years. Four years ago he was treated by Dr. Wilson of Portland for infantile paralysis. The first symptoms were drowsiness and a dragging of the right leg while the right eye was turned upwards. There is still some paresis of the inferior rectus muscle which was more marked before the instillation of atropin.

At the time of the illness the boy was not kept in bed but was treated by a Swedish masseur by massage and exercises. For about a month he lay about and would not take any interest in anything.

Was it true infantile paralysis or may it have been a case of encephalitis lethargica?

J. J. KELLY,
Secretary.

ST. LOUIS OPHTHALMIC SOCIETY.

February 25, 1921.

DR. A. E. EWING, President.

Compensation Laws.

DR. J. W. CHARLES read a paper on the French Compensation Law. He quoted Druault, who discusses the need of an explicit, tho arbitrary standard for oculists, who may be called before industrial compensation commissions. According to French law, a workman receives for total and permanent disability, a pension equal to two-thirds of his former salary, and for partial and permanent disability only one-half of the reduction, which his salary has suffered. For example: A man earning 2400 francs yearly sustains an eye injury with ultimate vision of 1/100. With such low acuity he can no longer follow his trade. Now if this is considered total disability, he is entitled to

a yearly pension of 1600 francs; if, however, he is considered as having partial disability, he will only receive one-half the reduction his salary has suffered, or about 1200 francs.

Druault's tables are based on the following considerations: If the vision of one eye is perfect, and the other eye is lost, the value of the lost eye (in terms of partial and permanent disability) is, in case of enucleation, 33 per cent. Hence, the values of all disabilities of one eye should fall between 0 and 33 per cent.

Therefore, a total incapacity corresponds to a partial incapacity of 133 per cent instead of 100 per cent. If the expert hesitates to testify to a total incapacity, he may compute a partial incapacity between 100 and 133 per cent as follows: 1.c. When visual acuity permits a figure between 100 and 116, he would give the highest figure for partial incapacity or 99 per cent, but if between 117 and 133, he may well decide upon total incapacity. For the sake of convenience, it is better to express the visual acuity in tenths for the superior acuities and in hundredths for the inferior.

DR. JOHN E. FLURY read a collective abstract of Compensation Laws in the United States.

DISCUSSION. Dr. E. H. Higbee: The Illinois plants of the American Car and Foundry Company follow the compensation law of that state, and use the tables recommended by Dr. Allport. Such tables are good and work out very nicely on paper. But the fact that many of these cases come before juries, means that any table that is used as a basis of compensation is usually of very little value, under these circumstances. Nevertheless, they are an absolute necessity in those cases in which settlement can be made with the injured party directly, or thru the Commission. In regard to the question of compensation; the amounts represented by Druault's chart are very much higher than anything in the United States.

Dr. Hayward Post: The question of double vision is a rather interesting phase of this subject. What disability

should be permitted a man for partial paralysis of an ocular muscle, causing double vision and dizziness? I do not see how you can construct any table for such conditions, because the degree of disability varies greatly, dependent upon the type of work with which the man is occupied, and for which he is trained.

Dr. Higbee: In the rare cases in which double vision cannot be corrected the claimant is given one-half of what he would receive for total blindness in one eye.

Albuminuric Retinitis Benefited by Decapsulation of Kidneys.

DR. A. E. EWING presented this case. Female, age 28, entered the Hospital May 26, 1917, suffering with parenchymatous nephritis. Ophthalmoscopic examination June 18, 1917, revealed marked central albuminuric retinitis, right and left. July 6. Decapsulation of the right kidney was done, the patient being apparently comatose. Disc of left eye was found swollen greatly, and there were numerous large retinal hemorrhages in its neighborhood. Oct. 8. Three weeks after the decapsulation of the left kidney, there was swelling of each disc and each retina with marked central fatty degeneration.

Dec. 24, 1917. Neuroretinitis has about subsided. Marked retinochoroidal atrophic changes thruout each fundus, cholesterol crystals in left macula. Central vessels smaller than normal. Each disc pale, margins defined. Jan. 10, 1919. V. = R., 20/48. L., 20/75. July 1, 1919. Returned to hospital with cerebral embolism, causing paresis of left arm and leg. July 4, 1919. V. = R., 10/19. L., 10/75. Oct. 1, 1920. Entered hospital because of chronic interstitial nephritis. Has a form of speech aphasia (albumin +4). No change in either fundus. Gradually became worse. Died November 18, 1920.

This case tends to confirm Edebohl's valuable suggestions with regard to operation in this class of cases. At the time of the first operation, this patient was apparently beyond hope of any further help. Two days following

the first operation, the improvement began. While she never ceased to have albuminuria, she had an extension of life for three years.

Nasal Furuncle with Ocular Complications.

DR. A. E. EWING reported the following. A housewife, entered hospital January 15, 1921, suffering with a carbuncle in the ala of the left nostril. At this time there was no swelling of the eyes, but there was a bluish tumefaction about the left nostril. Temp. 102°F. She had severe headache. The temperature rose to 105°. On the 16th, there was a distinct friction rub on the left side. There was also pain and tenderness in the gall bladder region. There was swelling and redness in the left upper cheek and the eyelids and the conjunctiva were edematous. In the carbuncle, there were a number of openings, externally and within the nostril. A blood culture showed staphylococcus aureus, which was also found in the culture from the nasal carbuncle. Cultures taken from the conjunctiva were negative. Cross incisions were made in the carbuncle to secure better drainage. On the 17th the swelling about the left eye was increased. There was some swelling of the right eye. T. 105°. The condition suggested an involvement of the cavernous sinus.

Eye examination: R. Slight swelling of orbital tissues in upper nasal region. Pupil active to strong light, media clear, fundus normal. L. Marked orbital infiltration, moderate conjunctival chemosis and ecchymosis about upper outer portion of globe, lower lid moderately everted, upper lid could be raised above pupil with difficulty, pupil normal in size, feebly responsive to strong light. Ophthalmoscope showed a slight general haziness of the media, no swelling of disc or retina, no retinal hemorrhages.

As there was a strong suspicion of an orbital abscess, an incision was made thru the upper nasal portion of the orbit into the frontal sinus from which a bloody serum was evacuated. The incision was continued into the ethmoidal cells, but nothing abnormal

was found. The middle turbinate was then removed and incisions made into the postethmoidal and sphenoidal cavities and then into the posterior portion of the orbit. There incisions showed nothing abnormal.

Röntgenograms of the head showed faint mottling in the region of the left antrum, left ethmoidal and left frontal sinuses. The patient died Jan. 18; the period of severe illness being four days.

CASE II. A somewhat similar case was seen May 25, 1907. This patient had a furuncle, the size of a split pea, on the left side of the nose. Before consulting a physician, the patient had picked it with a needle. The day following entrance to the hospital, a small necrotic plug was removed. After the removal of the plug, the swelling spread over the left side of the nose and rapidly involved the left eyelids and forehead. Left sided pleuropneumonia developed. Left exophthalmos and chemosis. Ophthalmoscope: Swelling of the disc and retina of each eye, more marked left. The swelling and induration of the left side of the face and of the orbit were very great. Under ether anesthesia, deep and extensive incisions were made in the indurated tissues on the left side of the nose and the center of the nose as far as the tip, in the cheek, and in the outer part of the orbit well back to the apex. No improvement from any treatment. Death, June 4, ten days after being first seen.

Dr. Mook had informed Dr. Ewing that he has seen three other cases, two of which died and one recovered. In the one that recovered, the face was swollen beyond recognition. Deep, long, free, vertical incisions were made thruout the face and the temples. In one of those that died the staphylococcus aureus was found in the blood. This experience of Dr. Mook is mentioned because the staphylococcus aureus was found in the blood of the first case mentioned above, which is fairly good proof that the disease is caused by this organism assuming a peculiarly virulent form.

DISCUSSION. DR. E. H. HIGBEE had seen several cases of cellulitis following operations on the nose in which

there was terrific swelling of the lids and displacement of the eyeball.

Dr. Julius Gross had seen two cases of carbuncle involving the eyes, both of which eventually terminated in death. One of these was a carbuncle of the lower eyelid, the man having carbuncles also in other parts of the body. The carbuncle on his eyelid eventually got well, but he continued to have these lesions, and later was taken to Washington University Hospital. He died of brain involvement. The eyeballs were not involved when seen. The other patient was a man who was perhaps sixty years old; he had an extensive involvement of the back of the neck and shoulder, and great sloughing. He developed an insidious iritis, which came on with very little pain, accompanied by an exudate in the anterior chamber, resulting eventually in what might be termed panophthalmitis—with very little pain, but the media clouded and the anterior chamber filled with exudate, and the eye was lost as a visual organ. This man lived for perhaps a year.

Dr. F. E. Woodruff was called to see a baby with intense swelling of the upper lid on one eye. Examination showed some fluctuation and beginning pus formation in the upper lid. That was on Friday. On Saturday the lid had almost entirely recovered except for slight swelling, and on Tuesday the baby died of pneumonia. All that was found was the pneumococcus.

Dr. W. E. Shahan, within the last two weeks was called to see an old lady who had been complaining of trouble in the left eye for about a week. The lids, particularly the upper, were so edematous that it was possible to get only a glimpse of the cornea. She was running a temperature of 101° F. and showing symptoms of general septicemia. There was an evident chronic dacryocystitis right and left, but the chief swelling was toward the temporal rather than nasal side of the orbit. Rhinologic and x-ray examination negative. Several incisions about an inch deep in various directions above the globe failed to produce any pus.

Death with symptoms of meningitis within a few days. The case was peculiar in that it exhibited the usual symptoms of cavernous sinus thrombosis with involvement of one orbit only.

Dr. Lawrence Post, two months ago saw a case of thrombosis of the cavernous sinus from which, at autopsy, the staphylococcus pyogenes aureus was recovered. The posterior ethmoids and sphenoids, before death and at autopsy, were found to be full of pus. The very great swelling and purplish color of the veins was the outstanding feature of the ophthalmoscopic picture. There was no swelling of the discs.

Dr. J. W. Charles was reminded there is a question whether the veins of the retina are always dilated. There is a communication between the ophthalmic vein and the angular vein, and there is usually a valve in that vein, which prevents much blood from escaping from the retinal veins into the angular. When that valve is not present, there may be an adequate exit for the blood in the retinal veins, in case of thrombosis of the sinus. His patient did not show great venous retinal engorgement. Postmortem showed sinus thrombosis.

Heat and Light Injury to Retina and Choroid.

DR. A. E. EWING. Case I. Had been operated on for cataract in the left eye in 1900 and had enjoyed practically normal vision. In 1904 the right eye was also operated on, but there was a central postoperative retinal hemorrhage by reason of which vision was always low. May 9, 1908, this patient inspected some newly completed smelting or blast furnaces, spending several hours looking at liquid metal at white heat. Two days later he complained that his vision was failing. Examination showed in L. a diffuse recent retinal hemorrhage about the size of the disc in the lower nasal portion of the macula, accompanied by slight grayish retinal edema. The vision was 20/24, four days later 20/48, and a month later 20/60, and several months later

there was a dense central retinochoroidal scar.

CASE II is that of a man 35 years of age. While repairing an engine, a 150 watt electric bulb exploded, with a great flash of white light that blinded the patient for a few seconds. Six days later he observed that vision was failing in his left eye. On the tenth day following the accident L. 20/75. Ophthalmoscope: extensive diffuse central retinal hemorrhage and two others between the disc and the macula. Altho the hemorrhages have been absorbing, the vision has gradually decreased to 8/150. R. = 20/20 —. There are a number of old retinochoroidal scars in the periphery of the right fundus. These scars were probably caused by a severe blow on the top of the head twelve years ago. There is no edema of the disc or of the nerve fibers as there probably would be with such extensive hemorrhages, were they the result of disease. They have all the appearance of being traumatic in origin.

DISCUSSION. Dr. J. F. Shoemaker, several years ago, had the opportunity of seeing a patient whose vision in one eye had been considerably affected by looking at the sun in partial eclipse, without any protection. Several months after the eclipse, while there were no fundus changes visible with the ophthalmoscope, his vision was decidedly impaired, it being about 20/40. The patient stated that it had improved considerably.

Dr. Shoemaker always had the impression that the effect in these cases was largely produced by the light on the retina, not thinking the heat could penetrate to the retina without injuring the cornea and crystalline lens. However, the experiments and studies of Verhoeff and Bell indicate this to be an erroneous view. They reported experiments made by the application, (1) of focalized sunlight upon the eyes of animals, and (2) by the use of the magnetic arc light concentrated by the single quartz lens system. They prevented heat from entering the eye by the use of a water cell in front of the eye, thus cutting out the heat rays, but allowing the light rays to enter. Ex-

posures as long as one and one-half hours were made, and the eyes examined afterward. Apparently, the vision was very quickly restored to practically a normal condition. They also made an experiment upon a human eye that was to be enucleated, because of a cancerous condition. The vision was 20/30. In this case also, the heat rays were cut out, and the light rays produced no deleterious effect. They make this assertion: "The results of these experiments show that, even with exposures of extreme intensity and length, but insufficient to produce heat effects, it is impossible to injure the retina by light containing any or all rays capable of reaching it thru the crystalline lens." If these experiments and theories be correct, it is the heat that affects the retina and not the light.

Dr. Higbee: During the Buffalo Exposition, the chief electrician was severely burned by coming in contact with one of the electric mains. He had bilateral cataract, which developed after the injury. Both lenses were extracted. The left eye ground was normal, but the right showed what looked like a retinal proliferation.

A young fellow using an acetylen torch for welding developed blindness in both eyes. When called to see him, numerous hemorrhages were found in both retinae. This man had a pair of colored glasses on, but there was no protection from lateral rays. This man improved. Watching him for a number of years; there has been no change in his lenses.

A patient had a scotoma outlined in a perfect half circle of the sun. He was a very intelligent man, and outlined the scotoma perfectly. Dr. H. is of the opinion that light affects the retina in spite of these experiments.

Dr. J. W. Charles: With regard to Verhoeff's experiments, they may perhaps explain the cases of eclipse blindness in which the patient looked at only a very small rim of the sun; when the remainder of the sun was eclipsed, one can hardly conceive that sufficient heat could enter the eye to do damage. There must be something destructive in the quality of the light. However,

the experiments certainly show that heat also can cause damage.

Dr. W. E. Shahan said: Dr. Lawrence Post and I made some experiments on the effects of heat upon the interior of the eyes of rabbits. A contact exposure of 140°F. for one minute to the lower part of the sclera produced marked but transient edema of the retina over a circumscribed area opposite the area of scleral contact. A contact exposure of 160°F. for one minute produced very marked edema of the retina with destruction of blood vessels visible at the sharply marked border of the edematous area. The final result of such an experiment is an eye which shows no external visible evidence of injury but a marked area of retinochoroidal atrophy opposite the area heated. This demonstrates that a degree of heat producing no visible changes on the conjunctiva and sclera may penetrate these structures and produce very marked immediate and remote effects on the retina and choroid.

DR. JOHN GREEN, JR.,
Editor.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTO LARYNGOLOGY.

May, 10, 1921.

Bilateral Glioma of the Retina.

DR. E. C. ELLETT reported a case of bilateral glioma of the retina. The patient was a little boy, aged 1 year. As soon as he began to walk it was noticed that he would run into furniture, etc. Vision was doubtful perception of light. The examination showed yellowish red masses in the vitreous of both eyes, with the vessels of the size and distribution of the retinal vessels, on the surface of the masses. The anterior segments of the eye and the tension, were normal. There was some interference with the light in transillumination, but parts of the fields were quite bright. Family history negative. Double enucleation was advised, as no other treatment has given much encouragement, tho spontaneous re-

cession may occur. Radium treatment was being tried.

Sympathetic Ophthalmia.

DR. ELLETT showed a section of an eye from a man who received a blow from a knot of wood 8 weeks previously. The eye was shrinking and was red and painful. Cornea small and distorted. The eye was removed on account of sympathetic irritation in the other eye, which showed itself in photophobia and a slight reduction of vision. These symptoms were relieved by the operation. The eye shows atrophy, intraocular hemorrhage, and detachment of the retina.

Cyst of the Upper Lid.

DR. ELLETT showed a section from a cyst of the upper lid, the case being exactly similar to one of which he had shown sections two or three meetings before. The appearance of the two growths was exactly similar clinically and microscopically, except that in the latter, which was from a girl 16 years old, the cyst was lined with round cells which showed well developed vessels.

Gonorrhreal Ophthalmia.

DR. STANFORD presented C. J. K., a white boy 3 years old who had been cured of gonorrhreal ophthalmia. Dr. Stanford first saw the patient on April 23rd after he had had a discharge from the eyes for one week. On first examination, the lids were found to be very much swollen, and creamy pus ran from the eyes on forcing them open. An ulcer about 2 mm. in diameter was seen on the inferior nasal quadrant of the left cornea. A smear was examined by Dr. Fleming and he reported "smear shows numerous gonococci." The boy was sent to the hospital and the eyes were irrigated with boric acid solution every hour, and mercurocrome 220, 2% was instilled following the irrigation. This was continued for a week, when the treatments were given every two hours. Atropin sulphat solution $\frac{1}{2}\%$ was instilled into the left eye three times daily.

Three or four times during the two weeks the patient was under treatment, the palpebral conjunctiva was painted

with 1% silver nitrat solution. The ulcer did not increase in size after treatment was started.

Glaucoma.

E. C. ELLETT, L. M., aged 62. Failing vision for four years. L. worse. Vision R. 1/200 L. 0. Both eyes showed atrophic and cupped nerves. The right disk shows a bunch of tortuous vessels on the nasal side. He had had a diagnosis of optic atrophy and a bad prognosis. Tension R. 50-60. L. 80, McLean. April 8th. Lagrange operation R. May 6th. Vision R. 4/200. Tension 37 Gradle. The fields before and after operation are shown.

A. W. aged 55. Some pain in eyes and failing vision about 14 months. Both nerves atrophic and cupped. Tension 45 McLean. Vision R. 20/200. Vision, fingers at 3 inches. Fields as shown.

April 6th Lagrange operation R. Corneoscleral trephine, with iridectomy in L. May 6th. Fields as shown. Tension R. 17, L. 9, (Gradle). Vision R. 20/80, with +4 cyl. ax. 180° = 20/40 -1.

Rupture of the Choroid.

DR. W. LIKELY SIMPSON presents J. S. I. with rupture of choroid. The patient

was seen 4-1-21 with history of having been struck in left eye ten days previously with a base ball. The vision has been blurred. Says he has been able to see only to the temporal side in left eye.

4-1-21 Findings at the first visit were as follows:

20	
V. R. — Fundus O. K.	
20	
20	

V. L. — Small hemorrhage in macula and a whitish area in the center of hemorrhage area. No tear in choroid to be seen.	
--	--

20	
4-15-21 V. OS — Hemorrhagic area	
100	

is now white with slight pigmentation and above the round spot at the macula is a whitish point running upward from macula region. The base of the streak is below. The retinal vessels can be seen coursing over the whitish streak.

6	
4-28-21 V. R. — Fundus same as	
200	

4-15-21.

E. D. WATKINS,
Secretary.

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OVER TREATMENT.

Neglect to apply effectively standard therapeutic resources that seem indicated is so opposed to the instincts and habits of the conscientious physician, and is so severely criticized by the laity if they find or believe that it has occurred, that there is liable to arise a feeling that it is better and safer to do too much for the patient than too little; and over treatment is probably more often the cause of delayed recovery than is neglect. Certain it is that in consulting practice rather striking cases of excess of zeal in treatment are not very rare.

An important form of over treatment is the too frequent repetition of local applications. In the early use of silver nitrat for the treatment of ophthalmia neonatorum, it was quickly recognized that it was harmful to repeat the application to the everted lids too soon. After each application a certain cycle of throwing off and regeneration of the epithelium must be gone thru, before it is wise or safe to repeat the application. If the interval is too short,

erosion of the membrane, thick fibrinous exudate, or pseudomembrane or hemorrhage may result. Once in twenty-four hours is quite often enough for such applications; often they will be more effective with forty-eight hour intervals.

It is probable that other topical remedies are used too frequently to secure the best results, altho the harm done is less evident. Every application to the conjunctiva, that provokes a sharp reaction, will cause a lasting harm if repeated before the reaction has run its course to approximate restoration of normal nutritive balances. Even milder remedies may be too often applied. In some persons the application of the usual ointment of yellow oxid of mercury provokes a sharp reaction that has not subsided by the next morning. In such a case repetition of the application every night may evidently aggravate the patient's trouble. Yet repeating it once in two days, or twice a week may bring rapid improvement. An infant with ophthalmia neonatorum may have its sleep broken, and be decidedly the

worse therefore, thru cleansing its eye at too short intervals, before the secretion has reaccumulated so as to require removal.

In general there is an optimum of frequency in treatments that will secure the best results. Any departure from it impairs the result, and the departure in one direction is as bad as in the other. There is opportunity for as much exercise of judgment in the frequency of repetition of local applications as in the selection of the substances to be used, or the best strength of solution to be applied.

The mistake of over treatment is often due to a desire to hasten the cure. It is not always recognized that time is an essential element in all healing processes; that the recovery will be less perfect if it is hastened; and if treated too much, the condition will be aggravated rather than improved. The desire to hasten the process of repair often arises, when in the natural course of healing the change becomes gradually less rapid from day to day, and it is thought that something may be found that will shorten the period of recovery, and allow the eye to be brought into use sooner.

Serious harm may be done by keeping up active treatment, after the need for it has passed and the lapse of sufficient time is all that is needed to complete the cure. Under vigorous measures an acute inflammation is brought to a crisis and begins rapidly to subside. It seems natural to suppose that under their continuance the eye should be well in a few days; but its further progress is unsatisfactory, and the substitution of something else equally active also gives unsatisfactory results. Here a suspension of treatment or a continuance of only the mildest measures is all that is needed to bring renewed improvement and the earliest cure that is possible for the condition. This undue continuance of treatment is often practiced with reference to the protective bandage, or the exclusion of light.

It must be recognized that certain conditions will get well only slowly and will only be made worse by at-

tempts to hurry them. This is particularly true of neuropathic inflammations, such as the corneal complications of herpes zoster, or those following small pox. It may seem like neglect to resort only to the mildest measures or await a return to health while doing nothing or using only placebos; but this may be the best management of the case possible, and the natural impatience of the patient must not be suffered to make things worse.

Persistence in the use of certain drugs may be harmful, altho their first effect has been very beneficial. It happens that in a good many cases the prolonged use of atropin, or other cycloplegics, sets up a chronic condition of the lids that keeps the eye sore, red and oversensitive to light, altho the uveal inflammation for which the drug is used has subsided. A very few patients show an idiosyncrasy to atropin that prevents its use for even a short time; but a much larger number are liable to develop an atropin conjunctivitis, thru its prolonged use, that gives the impression that the inflammation of the cornea or iris for which it was prescribed is not yielding properly to treatment. Such a conjunctivitis is likely to present enlarged follicles that may resemble those of trachoma and to be accompanied by decided photophobia.

It was pointed out soon after the introduction of dionin that too frequent application of the drug caused it to lose its beneficial influence, once in twenty-four hours is generally often enough if its use is to be continued more than a few days. There is reason to believe that the repetition of its effects, even at intervals of one or more days, over a long period may be harmful. It may even increase the corneal opacities and thickening of the conjunctiva that the drug was expected to remove; particularly if the interval between the applications is too short. There seems to be evidence in some cases that the use of dionin and atropin at the same time increases the tendency to set up an atropin conjunctivitis.

The danger of too long persistence

in local applications of silver nitrat causing staining of the tissues has been taught by the former experience with this drug. But it should be recognized that the danger of such silver staining is even greater with the newer, less irritant salts of silver. Cases of the kind have been encountered with all the newer salts that have had much use as topical applications to the conjunctiva.

The above instances illustrate the fact that any drug which can influence the vital processes strongly for good may also do harm if injudiciously applied. Familiarity with their use and with the good effects they produce only makes it more necessary to bear in mind possible damage that may be done with them, and to keep ever in mind the questions: Has this drug been used long enough? Would it be better to lengthen the interval between applications or doses?

E. J.

THE WASHINGTON CONGRESS.

The time has come when those who wish to contribute to the success of the Congress on Ophthalmology to be held in Washington next April should become members of the Congress, by sending to the Chairman of the Membership Committee, Dr. Walter R. Parker, David Whitney Building, Detroit, Michigan, their applications, each accompanied by the membership fee of ten dollars.

The number already registered, over 600, is probably larger than have joined in any preceding International Ophthalmological Congress; but in justice to American Ophthalmology it must be more than doubled.

When the International Ophthalmological Congress met in Lucerne in 1904 there were 45 Swiss ophthalmologists inscribed on its list of members. This was the support given from a country having a population of between three and four millions. To reach a like proportion there should be at least 1300 members of the Washington Congress from the United States alone.

There is everything in favor of registering now. The Committees arrang-

ing for the Congress are issuing bulletins containing important information which are sent to all who have become members. The local Committees that are to arrange for the entertainment of foreign ophthalmologists, who will visit various parts of the country, must be formed soon, to look over the local situation and see what can be done to make these visits most successful when the time comes. In the aggregate such gatherings may be quite as important as the general Congress at Washington.

For instance Prof. Barraquer of Barcelona desires to demonstrate his erisiphake and suction operation for the extraction of cataract; and it is desirable to afford him opportunity to do this in all the American cities he can visit. To some extent the arrangements for demonstrations of this kind will have to be made just before they are held. But this and the giving of such demonstrations will be comparatively simple, if the necessary committees have been organized previously, have looked over the local conditions, have laid their plans, and have arranged to notify all members of the Congress of the time and place for such demonstrations.

Many foreign members of such a Congress will be as much interested in seeing America as in attending scientific sessions. Ophthalmologists in portions of the country, where there are no universities to show, and clinics would be out of the question, can come in close personal contact with men whose names are famous in the literature of ophthalmology, while playing the part of hosts to guests who will be delighted to see famous natural curiosities, or the wonders of great industrial operations. To provide for the satisfactory care of such guests requires previous organization, so that when the visitor's desire is known, the Central Committee can at once put him in touch with some one who will guide him to the best fishing or thru the grandest mountain scenery or the largest automobile factory, as he may prefer.

Organization requires time, and all needful details should be worked out and in smooth running order before the date of the Congress is reached. The finding out of who will help in this work is the first step, and those who desire to join the Congress should do so immediately. It would be gratifying to the Editor to learn that in the coming month at least one-half the American subscribers for this journal had become members of the Congress.

E. J.

BOOK NOTICES.

Pathologie Oculaire, Histo-Pathologie de l'Oeil et des Annexes. V. Morax, Ophthalmologiste de l'Hôpital Lariboisière. Paper, 450 pages, 4 colored plates and 204 figures in the text. Paris, Félix Alcan, 1921.

This book was written at the solicitation of Prof. Cornil to form part of the fifth and last volume of Cornil and Ranvier's Manual of Pathologic Histology. The war has prevented the appearance of the complete volume, but permission has been obtained to publish this part in this form. The introduction mentions the collaborative assistance rendered by Madame Druault-Toufesco and Drs. Magitot, Landrieu and Darrieux. The illustrations are from specimens secured in the service of the Lariboisière hospital.

The first chapter, of 14 pages, is devoted to bacteriologic and histopathologic technic. It tells of the examination of external exudates and intraocular fluids, and then of the tissues. Under the latter are included examination of fresh tissue, fixation of tissue, washing, dehydration, inclusion for section and staining. This chapter gives a condensed but clear account of the best practical methods of preparing material for examination and preservation.

The bulk of the work is divided into chapters, each taking up the normal and pathologic conditions found in a particular part in this order, lids, lacrimal apparatus, conjunctiva, cornea and sclera, iris, ciliary body, choroid, retina, optic nerve, crystalline

lens, vitreous, affections of the eyeball and the orbit.

The manner in which each chapter deals with its subject may be illustrated by that on the cornea and sclera. First there is an account of the normal histology and development followed by notice of the congenital defects. Then the traumatic lesions and burns are described. The various lesions due to infections are discussed; and phlyctenular keratitis, rodent ulcer, filamentous keratitis, nodular opacities, arcus senilis, keratoconus, anterior staphyloma, ring opacity and tumors of the cornea are considered. The scleral lesions are considered under the headings congenital, traumatic, inflammatory and nontraumatic ectasias. The chapter on affections of the eyeball takes up glaucoma, atrophy of the eyeball, phthisis bulbi, myopia and hyperopia.

The illustrations are chiefly lithographs, with lettering printed on them to indicate the particular points of interest, and full explanatory legends. The colored plates illustrate the various organisms infecting the eye, the eosinophiles as seen in vernal conjunctivitis and the appearances found in siderosis. The examination of lithographs and colored plates would be a poor substitute for actual acquaintance with microscopic specimens; but such illustrations go far in supplementing the descriptions given in the text.

A most valuable feature for the student is a bibliography of 37 pages, giving the title and place of publication of each book or important paper on the pathology of the eye. These are carefully classified and arranged under structures affected and forms of disease. Thus under the eyelids we have: lesions of the margins, inflammation, chalazion, blepharochalasis, hyalin degeneration and new growths.

Probably few ophthalmologists in active practice will wish to dispense with the assistance of the laboratory man and his technician. But a proper understanding of histology, normal and pathologic, is the only sound basis for a knowledge of diseases; and there is much in ocular pathology that the general pathologist cannot appreciate.

While not the ideal, a good book knowledge of pathology is better than none; and this book by Morax is certainly one of the best, as well as the latest work on the subject.

Chirurgie de l'Oeil et des Annexes,

F. Terrien, professor agrégé à la Faculté de Médecine de Paris, Ophthalmologiste de l'Hôpital Beaujon. Second edition entirely revised. 620 pages, 495 figures. Paris, Masson et Cie, Editeurs.

This complete treatise on the surgery of the eye, is very welcome. It is an individualistic work and, tho very extensive, does not pretend to describe all the modifications of the various operations, but only those which have been in use and well tried out by the author. Thus it makes a conservative guide to ophthalmic surgical practice.

The first edition of this work was published in 1902, being the resumé of the instruction given by Professors Panas and de Lapersonne, at the ophthalmological clinic of the Hotel Dieu. In the present book the author has made a surgical treatise; which is clear and illustrated by many pictures in the text, which show the details of the different steps of the operations.

The indications for operation and the technic are completely and clearly described. Many new procedures have arisen in the last 20 years, such as the sclerectomy of Lagrange and the trephining of Elliot; which render less evil our prognosis of glaucoma. The technic of the operation for cataract is now much more precise. Suture of the cornea diminishes the danger of complications and makes certain the final result. By these the operation of extraction of cataract in the capsule, is rendered a safe procedure. However, the author warns the novice against the expression operation a la Henry Smith and comments unfavorably upon that of Barraquer. He says that extraction in the capsule is the operation of to-morrow. It now presents certain complications, and cannot now be recommended as a routine procedure. The use of the capsular forceps, by which a large piece of the anterior capsule

is extracted, makes secondary cataract less likely. The conjunctival flap prevents infections. Operations for ptosis, those on the ocular muscles, in the orbit and the extraction of intraocular foreign bodies, have now been perfected.

He has adhered closely to the plan of the first edition in giving the novelties the notice which they warrant; but has excluded descriptions of other common operations, when the procedures practiced and described by him are more simple and practical. Those which are not often employed are mentioned in small type.

The division of the text is regulated by the anatomy. After studying the surgical anatomy, the debutant is counselled to commence the reading of the work by the section of cataract. This is the most delicate of all operations and its details show the position of the operator and his assistant, the handling of the instruments, the fixation of the eye, the technic, precautions, etc., which apply as well to other operations. Before operating upon the living person, he counsels the beginner to perform the operation upon the pig's eye or, better yet, upon the cadaver.

Surgery of the eye is, at times, very precise and delicate. The emotions of the beginner, not to be gotten over for a long time, often augment the difficulties. It is only by practice the pupil acquires surgical nerve and a steady hand.

The contents begin with the preoperative technic and the surgical anatomy, the latter but briefly described. Contact, infiltration and regional anesthesia are fully given. The author rarely resorts to inhalation anesthesia for any operation. He then goes on with operations on the cornea, sclera, iris, cataract and its complications, prophylaxis, varieties, operations on the globe, operations on the annexes, the muscles, conjunctiva, lacrimal apparatus, the orbit and lids. He discusses lumbar puncture in ocular affections and visual troubles produced by tumor of the hypophysis.

As received the book is bound in pa-

per; type and illustrations are good; and it is not only recommended as a resumé of French practice, but is cosmopolitan in its scope.

H. V. W.

Microscopy of the Living Eye. Leonard Koeppe, Halle a. S. Volume I: **The Microscopy of the Anterior Segment of the Living Eye in Natural Light.** 310 pages, 62 partly colored illustrations, portrait of Professor A. Gullstrand. Berlin, Julius Springer, 1920.

With the construction of the slit lamp of Gullstrand, an entirely new and important method of examining the eye has been inaugurated. Foremost of all, Köppe elaborated it systematically by his painstaking investigations of the normal and pathologic anatomy of the living eye. Based on the results of his studies within the last six years, this work represents a complete theoretic and practical treatise of the intravital microscopy of the eye.

In ophthalmologic optic section, the construction of the Nernst slit lamp and its theoretic optics for the observation of the anterior segment of the eyeball, the general histologic examination of it with the slit lamp in focal light, and the methods of examining the sinus of the anterior chamber are discussed.

The special part deals with the microscopy of the living conjunctiva, cornea, aqueous, iris and sinus. Here the value and superiority of the microscopy of the living eye is clearly emphasized in many instances in which it allowed of early diagnosis of pathologic conditions, which could not be recognized by the ordinary methods; for example, beginning iritis, glaucoma, etc.

This valuable work will be greatly welcomed as a reliable guide in the introduction to this novel and important field of clinical methods. The external appearance of the book and the numerous illustrations are of superior quality. A second volume will describe the apparatus, technic and histology of the intravital posterior segment of the globe.

C. Z.

Diseases of the Eye. George E. de Schweinitz, M.D., L.L.D. Prof. of Ophthalmology in the University of Pennsylvania. Ninth edition, 832 pages, 415 illustrations, and 7 colored plates. W. B. Saunders Co., Philadelphia.

This text book of ophthalmology, which is intended for students and practitioners, needs no introduction. The fact that it has passed thru eight previous editions, speaks for its popularity and value.

The arrangement is much the same as that of the last edition, with the exception of the sections devoted to Visual Field Examination, Glaucoma, Sympathetic Ophthalmia, and Blepharoplasty, which are rearranged and added to. The number of footnote references to important articles, has been increased and a number of new illustrations have been added.

Reference to the following subjects appears for the first time: Jennings' Self-Recording Test for Color Blindness and Nagel's Card Test; Ophthalmoscopy with Red-Free Light; Measurement of Accommodation by Skiascopy; Electric Desiccation in the Treatment of Lid-Carcinomas and Epibulbar Growths; Unusual Forms of Conjunctivitis; Poisonous Gas Conjunctivitis; Striate Clearing of Corneal Opacities; Trypanosome Keratitis; Superficial Linear Keratitis; Keratitis Pustuliformis Profunda; Primary, Progressive Calcareous Degeneration of the Cornea; Anterior Lenticonus; Cysticercus of the Vitreous (previously only mentioned); Localization and Organization of the Cortical Centers of Vision, according to Holmes and Lister; Contusion and Concussion of the Eyeball in Warfare; Epidemic Grafts for the Correction of Ectropion (Epithelial Overlay); Free Dermic (Whole-Skin) Grafts for the Correction of Ectropion (previously only briefly recorded); Epithelial Outlay for the Correction of Ectropion (Gillies' Operation); Esser's Epithelial Inlay; Maxwell's Operation for Contracted Socket; Conjunctivoplasty; Modified Brossage, Simple Excision of the Retrotarsal Folds (Heisrath's Operation) in the

Treatment of Trachoma; Trephining the Sclera for Detachment of the Retina; Sclerotomy combined with Electrolytic Punctures for Detachment of the Retina (Verhoeff's Operation); Resection of the Sclera for Detachment of the Retina (Mueller's Method); Cartilage Implantation after Enucleation of the Eyeball; Mosher's Operation for Dacryocystitis.

W. C. F.

The Eye Ground in General Diseases.

Prof. H. Koellner, Würzburg. 185 pages. 47 illustrations, mostly colored. Berlin, Julius Springer, 1920. (See also v. 3, p. 777.)

This very well written compendium is intended to give to the practitioner a quick orientation of a subject which in the special ophthalmologic handbooks is treated too exhaustively for the purpose. Especial stress is laid not only on the interpretation and differential diagnosis of the ophthalmoscopic images, but also mainly for their value in the diagnosis and prognosis of general affections.

After a technical introduction on ophthalmoscopy, anatomy and the normal fundus, a general pathology of the fundus is given; setting forth how atrophy, degeneration, inflammation, and disturbances of circulation of the choroid, retina and optic nerve, appear in the ophthalmoscopic picture.

In the special part, the typical ophthalmic changes in the different general diseases are presented with excellent colored pictures, based on the author's own large experience of the fundus in eye clinics and in the abundant material of the Moabit Hospital in Berlin. To mention only a few, the chapters on arteriosclerosis, optic neuritis, papillitis, intracranial pressure and tuberculosis especially display how well the author has succeeded in performing his task.

C. Z.

Squint, Its Causes, Pathology and Treatment. Claude Worth, London. 5th edition. 242 pages. Philadelphia, P. Blakiston's Son & Co., 1921. \$3.50.

This new edition of Worth's excellent book does not differ much in scope the general physiology, pathology and

from its predecessors, aside from some improvements; and the original classification in twelve chapters, on Binocular Vision, Convergent and Divergent Squint, Etiology, Amblyopia Congenital and Acquired, Treatment, Heterophoria, Operations, etc., has been retained.

Operation is required in the majority of neglected or inefficiently treated cases, very rarely in those in which efficient treatment is carried out from the start. The author arranges his operative cases in three groups. The last, since 1905, consists exclusively of simple advancements. Worth's advancement operation, which is described in detail, admits of accurate adjustment; and the results have proved to be permanent.

Paper and print in this book are very good.

C. Z.

Der Lehrbuch der Augenheilkunde.

Prof. Dr. Ernest Fuchs. Thirteenth edition, revised by Dr. Maximilian Salzmann, Professor of Ophthalmology in the University of Graz. Octavo, paper, 1057 pages, 359 illustrations. Leipsic and Vienna. Franz Deuticke, 1921.

To have written a leading textbook of ophthalmology, that for 32 years has maintained its place in the literature of the world is a great service to the medical profession and to mankind. It gives a valid claim to the respect of all who have been helped by it. Such is the achievement of Prof. Fuchs, who now can leave to others the task of keeping the work abreast of the demands of the time, by introducing into new editions some account of the rapidly succeeding advances in ophthalmic science and art.

So well known is this work to American and other English readers thru the editions translated and edited by Duane, that a comparison with it of the present German edition is the most effective way of reviewing it for readers of this Journal. It must be admitted that such a comparison is most favorable to the sixth American edition, published in 1919.

The arrangement of the two works is slightly different. Both start with the general physiology, pathology and

therapeutics of the eye, followed by Part II on objective examination and functional testing. In the German edition Part III, Diseases of the Eye, first takes up the "protective organs," the lids, conjunctiva, and lacrimal apparatus, and follows with the cornea, sclera and uveal tract. While the American edition begins with the conjunctiva, cornea, sclera, and with the anatomy of the uveal tract combines an account of the development of the eye. In the Salzmann edition, glaucoma follows diseases of the lens and vitreous and wounds of the eyeball. In the Duane edition glaucoma precedes these; and after vitreous the latter takes up the retina and optic nerve, which Salzmann places immediately after the uveal tract. There are other differences of arrangement that add to the difficulty of making minute comparisons.

It is in regard to disorders of motility and anomalies of refraction and accommodation that the differences between the two books are most striking. It is in the chapters regarding these that Duane made the largest number of important additions to the original work of Prof. Fuchs; and with regard to them there has been the greatest development of practical detail in the last 30 years. Duane's additions and these practical developments have been ignored in the German edition. The brief accounts of tenotomy and advancement operations stand as they might have been written 35 years ago. Transplantation (lateral displacement) of muscle insertions is unmentioned altho for paralysis of the superior oblique it was published in 1903, and for paralysis of the external rectus in 1908. The latter, too, was reported by Hummelsheim to the Heidelberg Congress.

It is not surprising to find no mention of blastomycosis, for there is very little about it in the German literature, and only one German textbook makes even the barest mention of it; while each of the larger American works gives a fair account of it, to which its liability to cause blindness or great deformity of the lids entitles it. But it

is rather surprising to find so inadequate an account of ocular tuberculosis from 10 to 20 years after the publication of the work of Stock, Axenfeld, von Hippel and others. In this edition, of Fuchs' broadly inclusive work, there is exhibited a tendency to narrowness and chauvinism that is at variance with its original character, and contrasts strongly with the development of the successive editions prepared by Duane.

The clear simple statements make this book excellent reading for those who read German. Its paper, typography and illustrations are of superior quality. We can only wish that it reflected more of the development of ophthalmology that has occurred in the last third of a century.

E. J.

CORRESPONDENCE.

Cataract Extraction.

To the Editor: Thru the kindness of the Rockefeller Foundation I have received THE AMERICAN JOURNAL OF OPHTHALMOLOGY, in which I read with great interest the communications on the subject of operations for cataract. Allow me briefly to describe the method I follow.

During the past 17 years, in which I have directed the Royal Hungarian University Eye Hospital, No. 1, at Budapest, we have performed altogether 7797 cataract operations. Of these 5400 fell to me and 2397 to my assistants, acting for the most part under my supervision.

We attach great importance to the sterilizing of the conjunctiva. This we accomplish by dropping in the eye a 10% argyrol solution, and washing with a solution of 1-10,000 oxcyanid of mercury. We use 1% optochin only in cases in which bacteriologic examination of the conjunctiva shows the presence of pneumococci.

The technic of the operation is as follows: We use the Snowden speculum. Some time ago Professor Ladislaus Blaszkovics recommended a very practical speculum, the principle of which is the use of four supports resting on the adjoining bony structures, thereby obviat-

ing the possibility of pressing the eyeball. In fixing the eyeball we use the Weber forceps, provided with the Noyes lock, which, being bent, is not in the way. The fixing of the eye is entrusted to the assistant. To fix the eyeball of a restless patient the following method, recommended by Professor Blaskovics as a modification of Angelucci's idea, has rendered excellent service. The conjunctiva is cut and a thread is inserted into the superior rectus tendon.

Using a Graefe knife, we make the incision into the limbus, and a rather large flap wound, two or three lines deep, at the upper third of the cornea, and a large flap of the conjunctiva. It is better to make the incision a little too large than too small. The only drawback to the large wound is the resultant greater astigmatism. We cut the iris using the Liebreich forceps and the de Wecker scissors forceps. I have given up the round pupil extraction, since even the excision proposed by Hess, and the incision recommended by Elschnig, do not quite ensure against prolapse of the iris. In every case for years I have performed an iridectomy. We use the Schulek capsulotome, which has proved to be the best of all we have tried thus far. The expulsion of the lens is performed with the Daviel spoon. Extraction within the capsule is done in from 10 to 20% of the cases.

One of the most important complications of the operation is vitreous prolapse. The percentage of this complication in our operations has been between 2.5 and 3; tho this includes the operations of beginners and also conjunctival flap extractions. The explanation of this comparatively low percentage lies in the fact that one of the fundamental principles of operative technic is to avoid any secondary membrane. If the vitreous humor appears before expulsion, we remove the cataract with the Graefe spoon.

Being loyal to the Arlt school, we are ambidextrous, i.e., we use the knife on the right eye with the left hand, which is not difficult after a little practice. We attach special importance to holding the instruments lightly, at a distance from the blade, supporting our hands by means of the little finger.

In the after treatment, there are two dangers to be guarded against. The one is postoperative infection, which not always, but in aggravated cases destroys the sight. If we reckon all the operations performed, the total number of postoperative inflammations is about 2.5%, and of complete failures about 1%. Our endeavor to avoid infection has been fairly successful; altho in 17 years, besides myself, twenty of my assistants have operated for cataract; and naturally some of them were beginners.

The other drawback of the after treatment is our constant struggle to obviate reopening of the wound, which occurs in about 8% of cases. This is a very large proportion; and as the percentage has not varied for many years, in spite of the use of different kinds of bandages, we may justly conclude that lack of discipline in the patients is largely responsible for it. In the past few years Professor Blaskovics recommended the covering of wounds with the Kuhnt conjunctival flap. Krückmann proposed the same method, which gives hope of obviating their opening. However, I have not yet had sufficient personal experience of this method to judge of its value.

Yours very sincerely,

PROF. EMILE DE GROSZ, M.D.
Budapest, Hungary.

Visual Conservation and An International Congress of Ophthalmology.

To the Editor: About forty years ago an English physician, Dr. M. Roth, realizing that a large amount of blindness and acquired visual defects were preventable, gathered a few of his friends together and formed a Society for the Prevention of Blindness. These gentlemen themselves contributed the funds necessary for the printing and distribution of explanatory and propaganda material; and during the five years following 1880 about one hundred thousand pamphlets, leaflets, reports, etc., were spread throughout England and the continent, some of them even reaching America.

At that time so much interest had been aroused in this valuable work and it seemed to have such large possibilities for good that the Society offered a

prize for the best essay on the "Causes and Prevention of Blindness." The consideration of this subject was first taken up at the Third International Congress of Hygiene held at Turin, and the announcement of the prize offered was made at the Fourth International Congress of Hygiene held at Geneva in 1884. The conditions required of those entering into competition for this prize were carefully determined at this Congress. They were as follows. The essays might be written in English, French, German or Italian.

The subjects to be considered came under two general heads. First: The Causes of Blindness. a. Influences of heredity, diseases of patients, consanguineous marriages, etc. b. Eye diseases of infancy, various inflammations. c. School period—progressive myopia, etc. d. General diseases, diatheses, fevers, poisoning, etc. e. Influence of occupation, accidents and injuries, sympathetic ophthalmia. f. Social and climatic influences, infectious eye diseases, unwholesome, overcrowded, ill-lighted dwelling places, etc. g. Defective or total absence of treatment of eye affections.

Second: The most approved preventive measures to be stated for each of these groups. a. Legislative measures. b. Hygienic and professional measures. c. Pedagogic measures. d. Medical and philanthropic measures.

The Jury of Award consisted of some of the men then most eminent in ophthalmology. They included H. Cohn of Breslau, Streatfield of London, Dr. Fieuzal of the Quinz-Vingts, Paris, Dr. Reymond of Turin, Snellen, Sr. of Utrecht, and Marc Dufour of Lausanne; Dr. Haltenhoff of Geneva was secretary. There were seven competing essays, four in German, two in English, and one in French. The report of the Committee was published in 1884 in French, in the *Annales d'Oculistique* and the successful essay was put out in book form for gratuitous distribution by the British Society for the Prevention of Blindness. It was also printed in German by J. F. Bergman of Wiesbaden and in French in Paris, in both of these places it was

sold at about cost. With almost complete unanimity the prize was awarded to the then young but already distinguished physician, Dr. Ernest Fuchs, Professor of Ophthalmology at the University of Liege, Belgium.

During these same years Dr. Alvarado of Valladolid occupied much time and effort in widening interest and disseminating knowledge in Spain on the prevention of blindness from ophthalmia neonatorum. He wrote many papers on the subject and had printed at his own expense, thousands of leaflets giving advice as to the proper protective care of the eyes of new born infants. These were distributed largely thru the priests who gave them to couples whom they married. At about this time, too, Dr. L. Howe in America secured the passage in many states of a midwife law which goes by his name and which had great educational value. All of this occurred a generation ago and is an old story to those ophthalmologists who lived and practiced at that time. To those who are younger it will not be without interest.

After that time comparatively little was done in the line of ophthalmic preventive measures until the formation of the American Association for the Prevention of Blindness which was merged into the "New York State" and later into the National Committee for the Prevention of Blindness. The Society is now engaged in so large a work that it would seem that the time had arrived when its usefulness could be still further broadened. The amount of its last annual budget was thirty-five thousand dollars. Its work is well known in the United States but the great amount of valuable literature which it has accumulated could with advantage be used thruout the world. If it has done nothing else, it has conclusively demonstrated that the ophthalmologist no matter how skilled or how self sacrificing, can at best only remedy eye disasters after they have occurred. He can alone do almost nothing to prevent them. His best efforts at correction still leave so much to be desired that no one more

earnestly than he can desire that preventive efforts be undertaken.

The nations have always heretofore found science a neutral ground on which they can work together in harmony. Nothing can be more desirable than that amicable relations be again speedily restored. This can most effectively be secured by professional and other scientific men working together towards some beneficent end. During these years great progress on preventive lines has been made. We have learned that in group work only can the prevention of blindness or the conservation of sight be successfully secured. We now know that no matter how skilled the surgeon, nor how favorable the circumstance of the patient, large numbers of people lose their sight to whom it might have been preserved. In order that preventive measures may have any considerable effect a wide plan of organization is necessary.

The initiative must, of course, start with the ophthalmologist, but he must have associated with him the municipal and state departments of public health, the social visitor and the visiting nurse. He must confer with the architect who plans the schools and the work shops and the builder who constructs them. He must utilize the expert knowledge of the illuminating engineer, who will determine the character and the arrangement of the lighting employed in public buildings. He will put himself in closest touch with the factory employer and with the industrial physician in order that eye accidents may be as far as possible avoided, and that the first aid be prompt and efficient. This will at once, interest the agents of the accident insurance companies who have a financial as well as a humanitarian interest in all such preventive work.

The school physician can render great service, as well as the publisher of books for children; sight saving classes which are now exceptional will become general. In a word by organized cooperative effort we should in the course of time eliminate that one-third of those destined to be blind unless protective measures are taken,

but who should never lose their sight. To effect this an organized effort should be instituted similar to that which was carried out under the auspices of the various International Congresses of Hygiene to which reference has been made. Next year the International Congress of Ophthalmology will be held in Washington. Why should not a part of the time of this Congress be devoted to the Prevention of Blindness and the Conservation of Sight?

The National Committee for the Prevention of Blindness will gladly join in such a movement and if the Congress decides to make it a part of its program, will offer a generous prize for the best essay on "The Causes and Prevention of Blindness and the Conservation of Sight." The arrangement under which it would be given could be made jointly by a Committee chosen by the President of the Congress and the President of the National Committee.

There are doubtless many able and estimable ophthalmologists who are now suffering from the consequences of the war, who would gladly at this time enter into competition for such a prize.

F. PARK LEWIS.

Buffalo, N. Y.

TRIFOCAL LENSES.

To the Editor: My article on "Advantages of Trifocal Lenses and Reasons Why They Should Be Worn" published in the June number of the American Journal of Ophthalmology, p. 401, was originally intended only for reading before the Staff of the Geneva City Hospital; and therefore I neglected to give credit to authorities for accepted facts found widely stated in ophthalmic literature.

I had made notes from a copy of Dr. Thorington's book, from which the table of accommodation and statements regarding accommodation were taken. It might also have been pointed out that Thorington mentions the use of trifocal lenses, 1900 edition, p. 283.

I did not intend to call attention to trifocal lenses as anything essentially

new; but to point out the technic of their manufacture which would enable them to be used successfully. To my knowledge trifocal lenses were being made, both ground on and in cemented form, 27 years ago, before I had studied medicine, the distant vision thru the top wafer, the reading vision thru the bottom, the principal lens being the intermediate. But they were not successfully adopted and worn, and my article offers a better solution of the problems involved.

Fraternally yours,
JOHN A. SPENGLER.

Geneva, N. Y.

To Improve Our Literature.

To the Editor: Permit me to make two or three suggestions looking toward improvement in the writing of medical articles, which apply equally to Ophthalmic journals. In many articles the introduction is unnecessarily long. This criticism does not hold to the same extent as formerly. The medical journal is not the place for anything but the briefest prefatory remarks.

When an author is quoted his initials and place of residence should be given with his surname. Not to do this is unfair except in cases where reference is made to men of marked eminence. For example: Dr. H. J. Campbell of Buffalo publishes something and subsequently a writer refers to it giving credit to "Campbell." His colleagues in his own city might not connect the name with the individual. Were credit given to H. J. Campbell of Buffalo he would be definitely placed.

The name of the physician referring the patient to the man who reports the case should be omitted. There are more specific objections, but the information is certainly of no interest or value to the reader.

Occasionally one reads,—“and this condition continues to the present.” “To the present” is too indefinite. One has not time to ascertain when the article was written.

Most important of all. In case reports nearly always events of interest are indicated by dates. It would be

better if periods of time between such events were given. Let me illustrate from the first report I find, “On Sept. 22nd I first saw her (here follows a description of the case). On Sept. 26th there was ordered for her etc. etc. On Dec. 3rd the condition was much worse and the eye came to operation.” Most case reports have many such dates but this will do for an example.

In the above if Sept. 26th and Dec. 3rd have any interest for us it is only in that they indicate periods of time from the beginning of the illness. Reading is made rough and the continuity of thought is broken when we stop to compute that it was two and a half months before the operation was performed. Surely this must have occurred to many readers and yet I have seen no suggestion for betterment. It is just as easy for an author to write “four days later,” “three and a half months after the first visit,” or “twenty days following the operation,” etc.

There is so much read!

Very truly yours,
H. W. COWPER.

Buffalo, N. Y.

CERTIFICATES IN OPHTHALMOLOGY.

At its meeting in Boston in June, The American Board for Ophthalmic Examinations granted its certificate to the following applicants:

Barkan, Hans.....San Francisco, Cal.
Bruns, Henry Dickson, New Orleans, La.

Carpenter, Ernest W. Greenville, S. C.
Carvill, Lizzie Maud ..Boston, Mass.
Chapman, Vernon A. Milwaukee, Wis.
Clapp, Clyde Alvin ..Baltimore, Md.
Curdy, Robert James Kansas City, Mo.
Downey, Jesse Wright, Jr. Baltimore, Md.

Duckworth, Guilford M. Cuero, Texas.
Ellis, Edward K.Boston, Mass.
Ewing, Arthur E.St. Louis, Mo.
Fulton, John Farquhar, St. Paul, Minn.
Gifford, Sanford R.Omaha, Nebr.
Goldstein, Isadore ..New York City, N. Y.

Grosvenor, Lorenze Nelson.. Huron, S. D.

- Harbridge, Delamere F.Phoenix, Ariz.
- Hatch, Ralph A.Boston, Mass.
- Higbee, Edward Henry St. Louis, Mo.
- Holloway, Thomas B. Philadelphia, Pa.
- Holzer, William F. ...Worcester, Mass.
- Jack, Edwin E.Boston, Mass.
- Jacobi, FrankToledo, O.
- Jennings, John EllisSt. Louis, Mo.
- Keiper, George F.LaFayette, Ind.
- Kimberlin, Joseph W. ...Kansas City, Mo.
- Lancaster, Walter B. ...Boston, Mass.
- Lewis, William W.St. Paul, Minn.
- Lindley, Don Carlos ..New Castle, Pa.
- Markel, James Clyde ..Pittsburgh, Pa.
- Martin, AncilPhoenix, Ariz.
- Mills, LloydLos Angeles, Cal.
- Monosmith, Olney Benton...Lorain, O.
- Oertel, Theodore Eugene ...Augusta, Ga.
- Parker, Edward Frost ...Charleston, S. C.
- Peery, Thomas EdwardBluefield, W. Va.
- Quackenboss, AlexanderBoston, Mass.
- Raia, Vito Luigi ..Providence, R. I.
- Ravdin, MarcusEvansville, Ind.
- Robertson, Edwin Norris ..Concordia, Kans.
- Robinson, John M.Duluth, Minn.
- Slocum, George ...Ann Harbor, Mich.
- Smith, DorlandBridgeport, Conn.
- Smith, Owen Alonzo Farmington, Mo.
- Smith, StanleyPittsburgh, Pa.
- Snyder, Walter H.Toledo, O.
- Spangler, John Arthur Geneva, N. Y.
- Stevens, Henry B.Boston, Mass.
- Verhoeff, Frederick H. Boston, Mass.
- Wiggers, A. F. A.Flushing, N. Y.
- Wood, HilliardNashville, Tenn.

ABSTRACTS

Wright and Patton. Myiasis of the Frontal and Ethmoid Sinuses and the Orbit. Indian Med. Gazette. Vol. LVI. p. 58. Feb. 1921.

Major Wright, I. M. S., in charge of the Govt. Ophthalmic Hospital Madras, reports a case of a Hindu, f. 30, seen with extensive destruction of the forehead and brows, including the left and part of the right orbital bony plates, by maggots. The lacrimal bones had disappeared, the ethmoid was undergoing carious destruction, and the frontal sinuses, ethmoid cells and nasal fossae were involved. The eyeballs, completely exposed, bounded the ulcer and were proptosed, the left cornea being ulcerated. About 80 maggots were removed by permanganat and turpentine washings and forceps.

The history was one of a gradual swelling of eyebrows and lids, which was incised a month previously; nasal discharge increased and an ulcer followed the incision. The maggots were only noticed three days before the case was seen.

Major Patton, I. M. S., of Connor, identified the maggots as mature larvae of *Chrysomyia bezziana* (Villen-

eue). This fly is the specific myiasis producing Calliphorine of India, only depositing its eggs in the diseased tissues of man and animals. Patton says "This case is of peculiar interest, for it is clear that the eggs were laid directly on the ulcerated surface and not in the nose, altho the patient had a purulent discharge from the nostrils for some time. A nasal discharge often attracts the female to oviposit just inside the nostrils, and the larvae penetrate into the various sinuses connected with the nose."

Further it should be noted that, tho the larvae must have been very near the brain tissue, they did not enter the skull. And this emphasises the fact that the larvae of *bezziana* do not penetrate bone or cartilage, and that when these structures are destroyed, it does not mean that they have actually eaten their way thru them. Their destruction can only be brought about by dissolution thru the action of bacterial ferments. All muscid larvae only feed on fluid food, the substances or tissues on which they are feeding being dissolved by salivary and bacterial ferments."

F. P. MAYNARD.

Van Duyse, D. Removal of Cataract by Suction. *Le Scalpel*, Feb. 19, 1921, No. 8.

After having shown the advantages of the phacoerisis of Prof. Barraquer, van Duyse gave the history of suction of cataract. In Mesopotamia in the year 1000, a cataract was first removed by suction by Amar. He introduced a hollow flattened needle into the anterior chamber, and an assistant drew out the cataract. In the eleventh century, the Arabs, also, used the suction method. This was possible because in the orient cataracts develop at an earlier age than in our climate, and are often soft or partly soft. The suction method was then lost sight of. Guy de Chauliac mentions it in the fifteenth century. It was reintroduced on the continent in the nineteenth century by Blanchet, who practiced it at Paris in 1846 for soft cataracts.

M. DANIS.

Malling, Birger. Eye Symptoms in Encephalitis Lethargica. *Norsk Magazin for Laegevidenskaben*, v. 82, p. 369.

The author states that the most distinctive symptoms of encephalitis are somnolence and paralyses of eye muscles supplied by branches of the oculomotor nerve. He discusses these paralyses under the headings of ptosis, isolated and associated paralyses, pupil phenomena, disturbances of accommodation, nystagmus, etc. The theories as to the exact relative locations of third nerve centers are gone into at some length. Sleep is said to have a center located in the gray matter surrounding the aqueduct of Sylvius: a lesion in this region could give somnolence and could also involve one or more of the third nerve centres giving ptosis, etc.

Different centers are supplied by branches of several different arteries, hence a small lesion along a blood vessel could involve one group of centers without disturbing others. Paralyses of the eye muscles are of great importance in the diagnosis of this disease. During the years 1919 and 1920, the author saw a large number of atypical eye muscle paralyses, oftentimes tran-

sient, such as disturbances of accommodation without any history of diphtheria, inequalities of the pupils without suspicion of lues, etc., and suggests that these may have been manifestations of milder forms of encephalitis and that the addition to the name of "epidemica" may not have been without justification.

D. L. T.

Nakamura and Mukai. Influence of Intravenously Injected Medicaments on the Amount of Albumin of the Aqueous Humor. *Nippon Gank. Zasshi*, January, 1920.

The authors introduced watery solutions of fluorescein-potassium, fluorescein-sodium, potassium iodid, sodium-iodide, potassium-ferrocyanide, sodium chlorid, chlorcalcium per os, subcutaneously and intravenously into the organism of the rabbit and examined the amount of albumin of the aqueous humor. (Conclusion as follows).

1. Even less poisonous solutions when injected intravenously, act in increasing the albumin, while stronger poisonous solutions per os or introduced subcutaneously produced no action.

2. By intravenous injections of hypertonic solutions the amount of albumin is markedly increased, while it is less influenced by injections of hypotonic solutions even in large quantities.

3. Intravenous injections of hypertonic chlorid of calcium solution increased amount of albumin, while subcutaneous injections lessen the amount.

KOMOTO.

Maucione, L. Ulcerative Gummatous Lesions of the Tarsus. *Arch di Ottal* v. 27, p. 147.

The author mentions the previous reported cases, fifteen of which were in acquired lues and three in hereditary lues. His three cases all occurred in young adults with acquired syphilis. Infection occurred at seven, four and one year before the appearance of the lesion so that two cases corresponded in point of time to tertiary lesions, whereas the third, might be called secondary, as was borne out by the presence of a

papulopustular rash on the skin at this time. All cases had received more or less thoro treatment with mercury before they came under the author's care, but all were cured of local symptoms in from ten days to two weeks by from two to three injections of neosalvarsan. He considers that all three originated primarily in the deep tissues of the tarsus, only secondarily affecting the conjunctiva and skin. In diagnosis, the absence of swollen preauricular glands helps to distinguish the lesions from tuberculosis and their rapid growth and occurrence in young adults distinguishes them from malignancy. In comparing his treatment with that of other reported cases, it appears that neosalvarsan offers a much more rapid and complete cure than the older methods. A bibliography of twenty-four titles is appended.

S. R. G.

Pa. T. C. Bacteriologic Examinations of Smears from Conjunctiva. National Medical Journal of China, Vol. VII, No. 2, June, 1921; p. 52.

"In the total number of 1004 cases examined, organisms were found 497 times including 40 cases counted more than once on account of mixed infection. The Morax-Axenfeld bacillus was the most generally found, i. e., 166 times or a percentage of 33.4%. Staphylococcus was found 97 times or 19.3%, pneumococcus 95 times or 19%, Koch-Weeks bacillus 66 times or 13%, xerosis bacillus 29 times or about 6%, the streptococcus 7 times or about 1.4%, and the gonococcus 9 times or about 1.8%.

"There were 507 cases of trachoma and suspicious trachoma including those with complications. This is a percentage of 50.5% of the total number of cases. This corresponds closely to proportions of previous years. 280 of these cases or 55% showed no organisms. Organisms were found 252 times including 25 cases of mixed infection which are counted twice. The most common organism was the Morax-Axenfeld which was found 93 times or 37% of the times organisms were

found. Staphylococcus was found 49 times and pneumococcus 48 or about 19% for each. Xerosis bacilli were found 13 times (about 5%) and unclassified organisms 14 times. Streptococci were found 5 times (or 2%). In only one case with trachoma was the gonococcus found and this case had a corneal ulcer which was probably caused by this organism. The almost total absence of gonococci in trachoma cases in Peking is in marked contrast with the findings in Egypt where the gonococcus is so often found as a complication of trachoma."

H. J. HOWARD.

Braunschweig, P. Hemianopic Patients Aided by Prisms. Klin. M. f. Augenh. v. 65, 1920, p. 535.

The normal binocular individual commands a visual field of 180° width, the homonymous hemianopic of only 90°. If prisms, base to the left, are placed before the eyes of a patient with left sided hemianopia, and the fixation remains the same, a portion of the paralysed left visual field (next to the median line) is displaced to the healthy sight side and perceived. As the whole extent of the visual field, of the hemianopic of 90°, cannot be changed, it becomes shortened at the extreme right and in the same width. In reality, however, nothing is lost at the extreme right end, because the covering by the prisms does not reach so far. The resulting visual field is now composed of the displaced portion of the left field and the main portion of the right field. For practical use, it is more favorably arranged, by gaining valuable central territory for a less important peripheral area. Braunschweig did not go beyond prism 8°. At 5 metres distance by prism 7° a portion of 40 cm. is gained, in reading from 3 to 4 cm. Here the new line of print is easier found. A number of patients found the prisms a relief. The demands on the ocular muscles turning the eyes towards the defective side were also lessened, and less fatigue was experienced.

C. Z.

Favauge-Bruyel, A. J. de. Monocular Vision. Doctorate Thesis. Amsterdam, 1920.

The methods for examination of monocular vision are considered and the difficulty of finding a quantitative measure of its impairment is described. It is not comprehensive to restrict the examination to one part of the depth-vision (the parallax), especially when we examine what we understand under "habituation to the monocular condition," and realize the great influence of the intelligence. A method, which starts with the simple observation of monocular and binocular vision, promises to be broader and more objective.

Prof. Zeeman has given data about the acuity and distinctness of the images and the exactness of fixation; while the writer has determined the rapidity of observation, of fixed accommodation and convergence. She also investigated the size and form under which the objects are perceived, in this following Ascher. The rapidity of perception of monocular vision was investigated and compared with that of binocular vision. At a distance of 5 meters, no difference exists; while at a distance of 25 cm., the monocular needed more time than the binocular.

Prof. Zeeman has investigated the exactness of observation with the method used by Klara Grim (von Kries). He looked for the greatest distance with the relative distance of the points remaining the same, at which no mistakes were made. This happened as well monocularly as binocularly, when the points were seen under an angular distance of $5\frac{1}{9}''$, distance of the points 9 mm., distance of the observer from points 6 M. With Roelofs, he found that neither with light nor dark adaptation summation of stimuli exists, only the threshold value is lower binocularly than monocularly; but this is unimportant for one who has had for a long time monocular vision only. As regards the sharpness of the images, there exists no difference between the two conditions.

The estimation of size by monocular and binocular vision was investigated. Unknown objects were used, to exclude memory images. In the judgment of these unknown objects at different distances, no appreciable difference between the two was found. This is somewhat surprising, as the judgment of the size of a known object depends on the representation which we possess of it, the memory image; while the size of an unknown object depends only on the size of the visual angle and the distance. If the size of two unknown objects at different distances must be compared, it will only be possible when the distances are known, or can be estimated in some way. If the observation of distance or its representation is absent, we have two unknown quantities and we have to depend on size of the retinal image, that is the size of the visual angle. This was tried with normal binocular and monocular vision.

At 40 cm. from the eyes, a disc was placed, and at 80 cm. a row of 5 discs, different in size, from which one of the same size as the first had to be chosen. At the first determination, the disc of 12 mm. was put at 40 cm. from the eyes and 5 discs of 12, 16, 20, 24, 28 mm. at 80 cm. The patient was asked to choose from these 5 one of the same size. If a 20 mm. disc was chosen, he was asked to choose from a new row, the center of which had a diameter of 20 mm., that is from 18, 19, 20, 21, 22 mm. The experiment was done in a well lighted room during the day. The discs were looked at thru a mirror, which more easily keep the distances constant and does not prejudice as to the difference in distance. The patient may not touch the discs. Thus 40 normal persons were examined binocularly and monocularly and more than 70 with only one eye. The relative determination of distance with monocular vision is distinctly expressed in the valuation of the determination of size.

E. E. B.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, Lafayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu. Volunteers are needed in other localities.

DEATHS.

Harry L. Arnold, Omaha, aged 51, died July 8th, 1921, from heart disease.

James Foster Means, Claremore, Okla., aged 55, died July 9th, 1921.

Clovis Adams, New York, died July 28th, 1921.

C. D. Conkey, Duluth, Minn., died recently at Los Angeles, aged 65 years.

Henry Work Dodd, an Ophthalmic Surgeon of London, died June 28, 1921.

PERSONALS.

Dr. George H. Kress of Los Angeles is spending some time in England visiting the various hospitals.

Mr. Pridgin Teale, F. R. C. S., celebrated his ninetieth birthday on June 28th last.

Dr. Otto Barkan has established offices in the Physicians Building, 516 Sutter street, San Francisco, California.

Dr. C. W. Briggs, formerly of Fargo, North Dakota, is now located in the Lyceum Building, Duluth, Minnesota.

Dr. J. A. Stuckey, Lexington, served as President of the Kentucky State Medicine Society, which met at Louisville, September 27th.

Drs. Trimble and Granger, of Emporia, Kansas, have recently formed a partnership to practice eye, ear, nose and throat work in that city.

Dr. Robert Braunlin is now associated with his brother, Dr. H. W. Braunlin, of Marion, Indiana, in the practice of ophthalmology and otolaryngology.

Dr. Leighton W. Hovis, Charlotte, S. C., has become associated with Dr. A. M. Whisnant in the practice of eye, ear, nose and throat work.

Dr. D. F. Longnecker, of Emporia, Kansas, has retired from practice after thirty-five years of active work. He was a pioneer in Kansas in the fields of ophthalmology and otolaryngology.

Dr. F. Turner Roberts, formerly of Paris, Texas, announces the removal of his offices to the New Pacific Mutual Building, 523 West Sixth street, Los Angeles, California.

Dr. George E. de Schweinitz is on his way to China to attend the installation of the new directors of the Union Medical College at Peking founded by the Rockefeller Foundation.

Dr. Frank Allport gave a luncheon at the Chicago University Club on July 15th to about thirty members of the Chicago Ophthalmological Society in honor of Dr. de Schweinitz who was passing thru the city.

Dr. Leo Steiner, who for six years was chief medical examiner of the Chicago Civil Service Commission, has been appointed Superintendent of the Illinois Charitable Eye and Ear Infirmary, to succeed Dr. Hiram Smith. Dr. Steiner was formerly instructor in the old Bennett Medical College.

Dr. James Earle, of Salt Lake City, who had charge during the war of the eye department of the American Aviation Training Section at Issondon, France, has been appointed a surgeon in the regular army, and ordered to report for duty at the government hospital at Baltimore, Maryland.

Drs. Robert C. Coffey, Charles E. Sears, Wilson Johnston, Roy A. Payne, and their associates, have organized a Clinic in the Stevens Building, Portland, Oregon. They have also coordinated the Portland Surgical Hospital and the Portland Convalescent Hospital, forming a hospital unit for the practice of group medicine and surgery.

Dr. C. D. Conkey, who has practiced Ophthalmology in Superior, Wisconsin, and the last five years in Duluth, was given a farewell banquet by the Douglas County Medical Society, because he is taking up a new residence in Los Angeles, Calif. Dr. Conkey was recently the defendant in a case for malpractice, in which the jury, after 16 minutes deliberation, acquitted him.

Dr. John O. McReynolds of Dallas, Texas, has visited Barcelona to look into the work of Prof. Barraquer. He promises us a letter as soon as he has been on the ground long enough. He has been requested by the Chief of Air Service to investigate some of the ophthalmologic problems relating to pilots among the Allied Nations, and report to the Air Service upon his return.

SOCIETIES.

At a meeting of the Council of British Ophthalmologists in July, Mr. J. B. Lawrence was elected president; Sir George Berry and Mr. E. Treacher Collins, vice-presidents; Mr. J. Herbert Fisher, honorary

treasurer, and Mr. M. Stephen Mayou, honorary secretary.

At the meeting of the Chicago Ophthalmological Society some weeks ago, Col. Smith was the distinguished guest. Col. Smith has performed more cataract operations than any other man in the world. His paper was discussed by other operators of experience.

Dr. Ludwig Hektoen of Chicago read a paper upon the immune reaction of the lens, presented an array of tables and figures showing the results of his experiments with serums and antiserums prepared from lens substance. This paper brought out but little discussion, yet it is possible that it points the way to the end of cataract extraction, simply because there will be no cataracts to extract. There may be developed a serum or antiserum whereby incipient cataract will be checked early in its progress and possibly cleared up entirely.

The Colorado Congress of Ophthalmology and Oto-Laryngology was held in Denver, July 29th and 30th in the Assembly Room of the Medical Library Building. The Ophthalmological section was presided over the first morning by Dr. Harold Gifford of Omaha, and the second morning by Dr. W. H. Luedde of St. Louis. An unusually attractive program was presented and a large attendance was present throughout the session. The evening of the first day was devoted to a banquet at Troutdale-in-the-Pines, situated in the Mountain Parks district.

MISCELLANEOUS.

The Graduate School of the University of Minnesota announces a special one year course in Ophthalmology, to begin Sept. 28, 1921.

The Illinois Society for the Prevention of Blindness has recently obtained evidence of gross neglect on the part of six physicians in failing to report cases of ophthalmia neonatorum. The Society has written a communication to the Editor of the Bulletin of the Chicago Medical Society, asking cooperation in taking steps to prosecute these physicians.

Brooklyn has a unique way of caring for its blind. Once a year an entire week in the month of April, called "Blind Week" is devoted to their interests by all the women of the city. In the large ballroom of the Academy of Music, the work of these unfortunates is on exhibition and for sale. The various forms of handiwork taught them are here demonstrated for the edification of visitors. Orders are taken and thus these handicapped members of society are sure of remunerative work for months to come.

Hofrat Ernest Fuchs celebrated his seventieth birthday in July. On this occasion tribute was rendered by the physicians of Vienna, by the civil authorities of Vienna, and telegrams and letters from all over the world by his many grateful students and admirers. Fuchs stands too high to need

any encomiums. A short address by Dimmer, his successor, will, however, be of interest because it brings again to our attention the personality and achievements of this Master of Ophthalmology. The translation is by Dr. H. Barkan.

"The Master of Ophthalmology—Ernest Fuchs, began his career as a scholar of Von Arlt. Scarcely promoted to Docent he was called to Liége, Belgium, in 1881, where he worked for four years. At the early age of thirty-four, in 1885, he was called to Vienna and took over the second eye clinic as successor to Eduard v. Jaeger. Under his leadership the material of the clinic increased so immensely, that Fuchs was put in a position to assemble the richest possible clinical experience. His scientific excellence is distinguished by great thoroness and ability for calm, critical judgment which has made him one of the leading ophthalmologists. A great number of disease processes were first discovered by Fuchs and investigated by him; and a large number of disease processes already known were first given their proper explanation by him. He is a master of normal and pathologic histology and many important works which deal with operative technic and physiology of the eye have come from his pen. His text book, which a short time ago appeared in the thirteenth edition, has had success without parallel and has been translated into languages of all civilized nations. Fuchs who of free will retired six years ago was one of the best and most successful teachers of ophthalmology. We can thank him that ophthalmology has been busily engaged in by students and doctors, and that thousands of medical men remember gratefully this excellent teacher. Numerous are the prominent men whom Fuchs educated in his immediate surrounding. Three of the four ophthalmologic chairs in Vienna are filled by his scholars. Numerous were the physicians of foreign countries who, during the thirty years activity of Fuchs, worked under him and attempted to emulate his ideals and principles. They came from all the countries of the globe, and carried his fame back to their native lands.

If one wishes to judge worthily of the personality of Fuchs one must know his liberal spirit, his energetic physique and must consider especially the rich treasure of general culture which he acquired. Fuchs had visited not only all countries of Europe, but even far removed parts of the globe, America, Asia, and Africa. On one of these interesting trips he met Robert Koch in Africa and studied sleeping sickness with him. On another trip thru Asia Minor he went over the same route which had been blazed out by Xenophon. Fuchs is the master of many languages, to such a degree that he can give scientific lectures in them. In the six years in which he has been retired, he has worked with his former vigor at scientific subjects, and enriched still further the literature. He is

to-day still the man in Vienna, whose fame and work extend beyond the boundaries of our small country.

To complete a sketch of his character one must know his simple ways and his personal modesty, which has often led him to refrain from publishing some work because to him it did not seem good enough.

His scholars and his friends all unite in the wish that he may still have a long, successful career in which he will contribute more to his beloved ophthalmology."

LONDON POSTGRADUATE FACILITIES

Dear Doctor Black:

It occurred to me that some of the readers of the Journal of Ophthalmology might be interested in the present situation of postgraduate work in London, and I am accordingly sending you a few hasty comments which might be of interest to such colleagues as may have a European trip in contemplation.

Moorfields, the Royal London Ophthalmic Hospital, (founded in 1804), on City Road, E. C. 1, is now, as in the past, the particular London mecca for eye men. The present staff, with their clinic and operative days, which commence at 9 a. m., is as follows:

SURGEONS.

E. Treacher Collins, Esq., 17, Queen Anne Street, W. 1, (Mond., Thurs.)

J. H. Fisher, Esq., 83, Wimpole Street, W. 1, (Tues., Frid.)

Sir William Lister, K. C. M. G., 24, Devonshire Place, W. 1, (Tues., Frid.)

J. Herbert Parsons, Esq., C. B. E., 54, Queen Anne Street, W. 1, (Wed., Sat.)

Malcolm L. Hepburn, Esq., 111, Harley Street, W. 1, (Mond., Thurs.)

A. C. Hudson, Esq., 50, Queen Anne Street, W. 1, (Mond., Thurs.)

R. Foster Moore, Esq., O. B. E., 91, Harley Street, W. 1, (Wed., Sat.)

R. Affleck Greeves, Esq., 23 Wimpole Street, W. 1, (Wed., Sat.)

ASSISTANT SURGEONS.

F. A. Juler, Esq., 14. Portland Place, W. 1. (Wed., Sat.)

C. B. Goulden, Esq., 42, Welbeck Street, W. 1. (Tues., Frid.)

B. T. Lang, Esq., 22, Cavendish Square, W. 1. (Tues., Frid.)

M. H. Whiting, Esq., O. B. E., 9, Welbeck Street, W. 1. (Mond., Thurs.)

The Secretary-Superintendent is Mr. Robt. J. Bland, who will be glad to answer enquiries concerning the work. In the operating room, "George," who has for so long a time presided over the instruments, still holds forth as of yore. Moorfields has an in patient or bed capacity of one hundred and has ambulant or out patient clinics of over four hundred patients daily. At the date of this writing, there are about a dozen or more English, about a dozen East-Indian, a half dozen American and a few other postgraduate students. As in the past, the attending surgeons are uniformly gracious in their attitude and teaching, and Americans may be assured of most courteous welcome and treatment.

For any who wish more detailed information concerning London clinics, it would be well to write to the "Fellowship of Medicine and Post-Graduate Medical Association," which was organized in 1918, under the presidency of the late Sir William Osler. This organization has its office in the building of the Royal Society of Medicine at Number 1 Wimpole Street, London, W. 1. The executive secretary, Miss M. A. Willis, will be glad to give information to prospective students. Those who wish may receive the weekly bulletin of the Association, by sending the minimum membership fee of \$2.50; or single copies may be had by forwarding twenty-five cents in stamps. This Fellowship Society exists for the purpose of promoting Overseas and British postgraduate work.

In some of the Bulletins is printed a complete list of London hospitals, with street locations, and nearest underground station or overhead bus or tram route. It may be of interest to print the list of eye clinics for the week of July 4th, as given in the bulletin. It read as follows:

MONDAY, JULY 4.

9.00	Royal London Ophthalmic.....	Mr. Treacher Collins, Mr. Hepburn, Mr. Hudson, Mr. Whiting (O. P.)
1.30	Central London Ophthalmic.....	Mr. J. F. Cunningham, Mr. M. W. B. Oliver
1.30	Guy's	Mr. Ormond (O. P.)
2.00	King's College H.....	Mr. L. V. Cargill (O. P.)
2.00	Middlesex	Sir Arnold Lawson (I. P. and Opns.)
2.00	Royal Westminster.....	Mr. Grimsdale, Mr. Brewerton
2.30	Great Northern Central.....	Mr. McMullen

TUESDAY, JULY 5.

9.00	Royal Free.....	Mr. Hepburn
9.00	Royal London Ophthalmic.....	Mr. B. T. Lang (O. P.)
9.00	Middlesex	Sir Arnold Lawson, Mr. Affleck Greeves (O. P.)
9.45	Prince of Wales's.....	Lt.-Col. R. H. Elliot, Mr. Norman Fleming (Opns.)
1.30	Central London Ophthalmic.....	Mr. M. S. Mayou, Mr. H. P. Gibb

2.00	Guy's	Mr. Ormond (Wards)
2.00	Royal Westminster.....	Mr. Roll, Mr. McMullen; 4.30, Sir James Galloway, Lect., "Medical Ophthalmology"
2.00	St. Thomas's.....	Mr. Hudson
3.00	Royal Eye.....	Mr. L. V. Cargill (O. P. and Opns.)

WEDNESDAY, JULY 6.

9.00	London	Mr. H. Rowe Jeremy (O. P.)
9.00	Royal London Ophthalmic.....	Mr. Foster Moore, Mr. Affleck Greeves (O. P.)
9.30	Hampstead, Gen'l. H.....	Mr. Letchworth (O. P.)
10.30	London	Mr. Roxburgh (Lect. Dem.); 1.00 (I. P.)
1.30	Central London Ophthalmic.....	Mr. A. H. Levy, Mr. H. Neame
2.00	Royal Westminster.....	Mr. Cruise, Mr. Viner, Mr. Hine
2.00	St. Thomas's.....	Mr. Hudson
3.00	Royal Eye.....	Mr. A. D. Griffith, Mr. Latchworth

THURSDAY, JULY 7.

9.00	Royal London Ophthalmic.....	Mr. Treacher Collins, Mr. Hepburn, Mr. Hudson, Mr. Whiting (O. P.)
10.30	London	Mr. Roxburgh (Opns.)
1.30	Central London Ophthalmic.....	Mr. J. F. Cunningham, Mr. M. W. B. Oliver
1.30	Guy's	Mr. Ormond (O. P.)
2.00	Middlesex	Sir Arnold Lawson (I. P. and Opns.)
2.00	King's College H.....	Mr. L. V. Cargill (Opns. and Wards)
2.00	Prince of Wales's.....	Mr. Norman Fleming (O. P.)
2.00	Royal Westminster.....	Mr. Grimsdale, Mr. Brewerton
2.30	Great Northern Central.....	Mr. W. H. McMullen

FRIDAY, JULY 8.

9.00	Middlesex	Sir Arnold Lawson, Mr. Affleck Greeves (O. P.)
9.00	Royal London Ophthalmic.....	Mr. B. T. Lang (O. P.)
1.30	Central London Ophthalmic.....	Mr. M. S. Mayou, Mr. H. P. Gibbs
2.00	Royal Westminster.....	Mr. Roll, Mr. McMullen
2.00	St. Thomas's.....	Mr. Hudson
3.00	Royal Eye.....	Mr. E. A. Dorrell

SATURDAY, JULY 9.

9.00	Royal London Ophthalmic.....	Mr. Foster Moore, Mr. Affleck Greeves (O. P.)
9.30	London	Mr. H. Rowe Jeremy; 10.30, Mr. Roxburgh (O. P.)
1.30	Central London Ophthalmic.....	Mr. A. H. Levy, Mr. H. Neame
2.00	Royal Westminster.....	Mr. Viner, Mr. Hine
3.00	Royal Eye.....	Mr. A. D. Griffith, Mr. Letchworth

From the above, it is seen that London offers very considerable facilities, in spite of the fact that the hospitals are at times, somewhat inconveniently arranged as regards nearness to one another. But the underground or tube service is excellent and that aids greatly. Living conditions and prices are about those of America for similar standards of living. The executive secretary of the Fellowship will give lists of hotels, etc., if requested.

The "American University Union in

Europe" at 50 Russel Square, W. C. I., London, will also be glad to give information. Likewise "The English Speaking Union" at No. 1, Charing Cross, London.

If the above can be of service to one or more of our colleagues who may have their first trip to England in contemplation, the time taken to pen it, will be construed as having been well spent.

With best wishes, cordially,

GEO. H. KRESS.

Los Angeles, Calif.



DISCIFORM KERATITIS. (BANE'S CASE)

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DISCIFORM KERATITIS

WILLIAM C. BANE, M. D., AND WILLIAM M. BANE, M. D.

DENVER, COLORADO

This is the report of a case followed thru its course to recovery from inflammation and partial restoration of vision. The possible etiology is discussed.

In reporting the following case of disciform keratitis, we are making no attempt to give a review of the literature upon this disease, but will merely emphasize the most common and predominant signs and symptoms, and mention briefly some of those occurring less frequently. For comprehensive reviews of the literature, one may refer to an article by Weeks, in The Transactions of the Section on Ophthalmology of the A. M. A. for 1918, the article by Fleck in the A. J. O. for August 1921, and that of Junius in Graefe's Arch. f. Ophthalmologie v. 105 p. 177.

Miss. M. B., age 27 years, was referred to us on November 9th, 1920, giving the following brief history. For three weeks before coming she had noticed that the left eye was somewhat inflamed, and for the first two weeks it gave her very little discomfort and no perceptible change in vision. However, during the last week, the redness increased, the vision became hazy, and for five days and nights she suffered more or less pain in the eye and the left frontal region. She could throw no light upon the possible cause of the trouble, having had no injury or foreign body in the eye, no constitutional disease, nor smallpox.

First examination revealed a moderate circumcorneal congestion, a slight discoloration of the iris, with the pupil normal as to size and reactions. There was a haze in the substance of the cornea, about 4 mm. in diameter, its center being 1 mm. below and to the temporal side of the corneal center. The corneal epithelium showed

no abrasion, and at this time there were no bloodvessels approaching the opacity. Vision: Right 5/4, Left 5/20. The pupil dilated readily with atropin, but the tension rose to 40 mm. mercury, and the use of it was not continued. The pain became gradually less severe after one or two days.

On November 24th, a blood Wassermann was negative with three antigens, but mercury suppositories of $7\frac{1}{2}$ grains each were prescribed for three weeks. No benefit was observed. The opacity seemed more dense and extending downward, and the vision was reduced to 5/60. There was no pain nor congestion.

On December 20th, after three days of pain, she appeared with the eye red and tender to palpation. For the first time, about two months after the onset of her trouble, we noticed three smaller spots of greater density in the corneal disc, one in the center and in the deeper layers, the second more superficial and near the temporal margin of the original opacity, and the third a small grayish spot about $\frac{1}{2}$ mm. in diameter near the temporal sclero-corneal margin. Also, for the first time, we observed three small bloodvessels extending from the scleral margin to the disc opacity. Began subconjunctival injections of 2% cinnamat of sodium, 15 m. at a dose.

January 15th. The subconjunctival injections have been repeated at intervals of four to seven days followed by severe pain lasting for an hour or so, but the eye has remained comfortable between visits. As a result of these injections, or merely as a coincidence, the

disc opacity has become much smaller in diameter, of less density, and the whiter spots in the substance of the cornea have disappeared. Eye not congested, nor tender.

On February 17th, the last date on which any notes of the case were recorded, the vision had returned to 5/20, and the opacity was thinner, but was pierced thruout by the bloodvessels. Apparently the process had come to a standstill. The illustration on Plate X, shows the appearance at this time, but the leash of vessels is not clearly shown.

Our patient's history of onset without definite etiology, together with the signs and symptoms, the protracted course, and the final outcome, unquestionably place her case among that class of cases described by Fuchs as disciform keratitis. It would seem, as pointed out by Weeks and others, that true disciform keratitis differs in several particulars from that type of keratitis which accompanies or results from smallpox or vaccine virus.

As to the etiology; having ruled out, as far as possible, injury, syphilis, smallpox and vaccine virus, we have yet to consider infection from without, the neuropathic origin as claimed by Verhoeff, and tuberculosis. Which of these was the etiologic factor in this case we cannot decide, but certainly

the treatment under which the greatest improvement was obtained was subconjunctival injections of cinnamat of sodium. This is one of the drugs recommended in the treatment of various tuberculous lesions. Tuberculin was not used.

It seems well to emphasize two features of the disease noticeable in our case. First, it took about two months after the onset of the disease, before the deeper white spots in the already existing opacity made their appearance. Also that it was not until this time that the leash of vessels from the sclerocorneal margin to the disc were first noticed. The other thing worth emphasizing is the frequent tendency toward glaucoma, which these cases present. This fact also is mentioned by Weeks, and at the present time one of our colleagues has under his care a case of disciform keratitis, which developed an alarmingly high tension after the instillation of homatropin.

Summing up the information at hand concerning this disease at the present time, one can only conclude that the various forms of deep seated keratitis resembling true disciform keratitis, arise from a variety of causes, and that until further study and investigation have been made and more definite knowledge obtained, it will be impossible to make a positive differentiation between them.

LATE TRAUMATIC DETACHMENT OF RETINA. ITS PROPHYLAXIS AND IMPORTANCE FROM A DISABILITY COMPENSATION STANDPOINT

HAROLD GIFFORD, M. D., F. A. C. S.

OMAHA, NEBRASKA

The writer finds that practically all cases of monocular retinal detachment occurring in eyes not predisposed to such detachment, give a history of previous severe injury of the eye which may have occurred years before. Liability to such late detachments justifies treatment at the time of injury directed to its prevention. It also may become a very important consideration in the settlements for damages produced by the injury. Read before the Sioux Valley Eye and Ear Academy, July, 1921.

That a traumatic detachment of the retina may become apparent some time after the occurrence of the original injury, is probably fairly well known; nevertheless, an examination of a half dozen of the most popular ophthalmic textbooks has failed to record any appreciation, on the part of the authors, of the significance of the fact.

My own interest in the subject was first aroused by the following case: Feb. 22, 1902; L. C., aged 11; while manipulating a boy's "sling-shot," was struck in the right eye by the handle of the implement, which slipped out of his hand while the rubber was on the stretch. I saw him within half an hour and found the eye somewhat congested with a little blood in the anterior chamber and the vitreous too dark to permit a clear view of the fundus. In the course of the next two weeks, the blood cleared up, the congestion disappeared entirely, and as nothing wrong was discovered in the interior of the eye except slight vitreous opacities and a small lens opacity near the posterior pole, he was dismissed with vision 20/30+. The sight became practically as good as that of the other eye and remained so for nearly four years.

At the end of that time, he was again brought to me on account of a disturbance of vision of the right eye, which he had noticed for several days. I found a moderate sized detachment chiefly in the lower outer quadrant but reaching to the center; Vision, = 20/200. In spite of rest, bandaging and sweats, the detachment increased;

and the only result of a good sized puncture of the sclera with cauterization of the wound edges, was a decrease in the vision from the increase of vitreous opacities which took place during the reaction following the puncture. The sight eventually decreased to fingers at 8 ft.; where it has remained for fifteen years. The left eye has always been normal with vision 20/15, after correction of a slight myopic astigmatism.

In succeeding years, the writer has paid especial attention to the history in his detachment cases, and he can recall no case, in a patient under 50, with the other eye normal, in which he has not obtained a history of a severe shock from a blow or fall on the head or eye, (in one case from a jet of water from a fire hose) preceding the appearance of the detachment by a period of from a day or so to (in one case) ten years.

The case, last referred to, was that of a man 26 years, who came to me, Nov. 10, 1919, with a detachment of the lower 2/3 of the left retina, and V.=4/200. The right eye had V=20/15 without a correction and was normal except for very slight vitreous opacities. Eleven years previously, he had received a hard blow on one eye with a piece of rubber hose, and had to keep it bandaged for two weeks. After that the sight seemed to be as good as ever and he noticed nothing wrong, till August 1918, when the sight of the left eye began to blur and gradually reached the condition seen in 1919. Altho the patient had no recollection

as to which eye had been hit; it seems not unreasonable to include this as a case of late traumatic detachment.

Deeply penetrating wounds doubtless cause late detachment in some cases, not from the contusion, but from the formation of vitreous bands. A remarkable case of this kind was reported by von Hippel (abst. in Arch. of Ophthal. July 1916, 319), in which a detachment developed 16 years after a shot wound which healed leaving a thin cord running thru the vitreous.

The recognition of the fact that detachment is liable to occur from one to several years after any severe blow on the head or eye, in spite of an apparently complete recovery from the immediate effects of the injury, is of importance in the management of such accident cases on at least two counts: prophylaxis and advice to the patient concerning settlements for damages or disability compensation. With regard to prophylactic treatment; assuming, as I think we may, that most of these late detachments occur because of slight retinal injuries, which from one cause or another have not been discovered, or not thought worth treating, at the time of the accident, it follows that after every noteworthy contusion of the eye, the entire fundus should be examined with the most scrupulous exactness and unless the oculist is certain that no lesion of the retina exists, or if the media are too hazy to permit such an examination, the case should be treated, not only for the evident lesions, but for the purpose of preventing a possible late detachment. Anyone who has not made a practice, in such cases, of dilating the pupil and very carefully examining the whole retina, will be surprised to find how often, after comparatively slight blows, lesions in the shape of small hemorrhages or areas of opaque and raised retina will be found. These are frequently in the extreme periphery where they may be easily overlooked. It is, naturally, impossible to say how many of these injuries would lead to late detachment or to what degree any early treatment will guard against the latter. Never-

theless, it cannot be denied that such prophylactic measures may turn the scale in favor of future immunity. Therefore, in addition to the ordinary measures, the writer keeps all such patients in bed or sitting at ease, with both eyes bandaged lightly for at least a week after the accident; this being combined, for the same length of time, with salicylat or pilocarpin sweets. The selection of an occlusion period one week in length is, of course, purely arbitrary; less might suffice or more might be better; but the week seems a fair compromise between unreasonable strictness and recklessness. If the injury be a severe one, so that at the end of a week the media are still so hazy as to prevent a careful examination of the interior, two or three weeks of occlusion would undoubtedly be better. In enunciating this principle in the prophylactic treatment of late detachment, the writer is under no illusion as to the size of the following which it will attract; the vast majority of eye contusions will be treated, as heretofore, without reference to potential late detachments. He would, however, ask each of his readers, who realizes that such a result is by no means very uncommon, whether if he or his child were the subject of such an injury, he would not desire the cheap insurance theoretically afforded by a week's double occlusion bandage.

In the matter of prognosis and subsequent cure, the conclusion is obvious. Every patient with this sort of injury should be warned that he has a vulnerable optic which may eventually become blind; so that, for a couple of years at least, the avoidance of occupations or games involving much chance of bumps or jolts would be only a reasonable precaution.

The prognosis becomes of special importance if the patient carries accident or disability insurance; or if the injury has been caused by some financially responsible party. Here, it is the imperative duty of the physician to advise the patient not to settle for damages or compensation, except on a contingent basis, with a full recognition,

in writing, of the possibility of future loss of sight from the late detachment, or other remote results of the accident. The fact that the physician may be employed by the damager involves, of course, no waiver of this duty.

To emphasize the importance of this consideration, I report the following case: A. G., aged 44; injured by a dynamite explosion which destroyed the left eye and produced cataract in the right eye. The cataract was operated on and the man, on recovering nearly normal sight, settled in full for the sum of \$600.00. Three years later he developed detachment of the retina, and when he consulted me, he had been totally blind for one year.

CONCLUSIONS: A large proportion of

the detachments of early life, in unpredisposed eyes, are of the late traumatic class.

As a matter of prophylaxis against such detachments, a period of as complete rest as possible (including binocular bandage) is desirable in the treatment of serious contusions of the eye.

The possible occurrence of late detachment should always be provided for in settlements for damages, or disability compensation in cases of serious contusions of the eye. This applies with equal force to cases of deep perforating wounds with or without intraocular foreign bodies, or to accidents where the head or whole body has received severe shock.

TENOTOMY AND LOOPING FOR THE SURGICAL CORRECTION OF STRABISMUS

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ST. LOUIS, MO.

The advancement operation here described is practiced with tenotomy of the opposing muscle. It seeks to secure a firm anchorage and to prevent the failure of the sutures to hold by passing them thru the tendon which has been split and drawn aside in two loops, and thru two gold plates, which acts as a clamp.

In presenting this surgical procedure for the correction of strabismus, full cognizance is taken of the many excellent methods previously devised, their relative merits and the benefits of the final results. With these facts in mind, I can offer the following only

thru its tissue or cause sloughing at the point of anchorage. A muscle that has slipped becomes attached again further back either to the globe or the conjunctiva and consequently exerts no pull, being completely relaxed, as has been demonstrated in cases where two



Fig. 1.—Gold plate thru which two double armed sutures are threaded and second plate over which they are tied on completion of the operation.

with the addition of an apology, for I know that surgeons in general are bored to a greater or lesser degree by the inflictions of others.

The primary object of correcting a strabismus, surgically, I feel is purely cosmetic. The restoration of vision along with binocular function, such as fusion and the perception of perspective, is secondary and develops gradually after the eye has been brought back into position and made to work.

During the past few years, in both my private work and the eye service at the Washington University Medical School, I have corrected a considerable number of cases of both internal and external squint with surgical measures. The results have been generally very good, altho some cases possessing deviations of 50° to 60° required two operations and even then were unsuccessful. However, this was the exception rather than the rule.

The chief deficiency of most techniques lies in the fact that the sutures holding the tenotomized muscle pull

operations had been done. Again, if the sutures should hold, there may be stretching of the various tissues.

Another point is that the amount of advancement, resection, or other manipulation to be done, cannot be accurately determined before operation, with a few exceptions, which again in turn have other disadvantages. Usually, the muscle pulling in the direction of the strabismus is tenotomized. It is the constant pull of the opposing muscle upon weakened parts of the exterior of the globe which is responsible for the many failures properly to correct a strabismus. This operation eliminates the foregoing faults.

The factors involved, then, are the establishment of a firm anchorage of the manipulated parts into tissues that are sufficiently firm to withstand stretching, and a consideration of the degree of rotation necessary to bring the eye back into as nearly a normal position as possible. It is obvious that the best permanent results in any operation for strabismus are obtained in

eyes where the vision develops as a natural consequence of resumed function or is helped by correct lenses, which combined forces help the eye to fix in a proper position, that is to say, with the macula.

Frequently I am asked "How do you determine the amount of muscle to take up?" I have had to answer that usually I did not know exactly but that a maximum degree of advancement was desirable, an overcorrection sometimes being advantageous. In the following, I am able to determine with some degree of accuracy the proper amount of tendon to take up.

The problem is to straighten the crossed eye. The principle employed

A point of importance is to measure accurately the degree of squint in each case by one of the approved methods and also to have a good photograph taken of the patient, a full front view, showing the precise nature of the defect.

The necessary equipment for this operation consists of a speculum, tenotomy shears, sharp pointed scissors two tenotomy hooks, dissecting forceps, needle holder, a small, sharp knife (a discarded Graefe is excellent), two double armed sutures with two small gold plates described below, and one single suture with which to close the tenotomy wound.

The two double armed sutures,

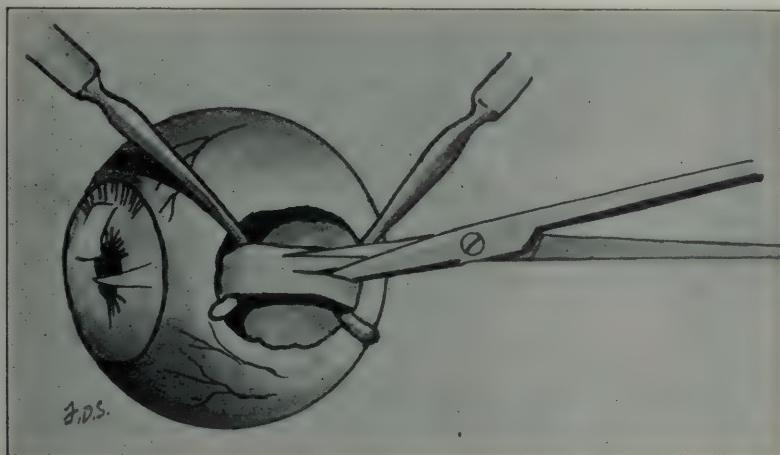


Fig. 2.—Showing muscle held up and away from globe by tenotomy hooks, while being split.

is to decrease the amount of pull of the muscle which is pulling the eye away from the central line of fixation, and then to increase the action of the opposing muscle. In this operation a tenotomy is done on the muscle having the greatest amount of pull and then a looping of the opposing one.

It has been the author's experience that it is well to do a complete tenotomy of the muscle with the excess of pull, for even then immediately following this step, there will be a turning of the eye toward the mid-line of about one-half its original deviation. This is especially true in cases showing a high degree of strabismus.

about twelve inches long, are threaded through a plate seven mm. by two mm. rolled out of 14 karat gold wire, in which four holes one mm. in diameter and three-fourths mm. apart are drilled. The edges of these holes are smoothly polished so that the suture will not be cut by the rough edge of the circle.

Two of these plates are required in the technic, the first thru which the sutures are threaded in a manner described in the following paragraph, and the second over which the same sutures are tied upon the completion of the operation. One of the sutures (Fig. 1) is threaded thru the first

two holes of the plate with a loop on one side and the needles and remaining silk protruding on the other. The second suture is put thru the remaining two holes in a similar manner.

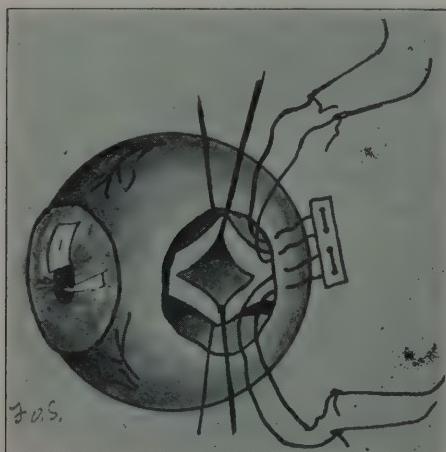


Fig. 3.—Split muscle separated by tension sutures, and the four sutures carrying the gold plate passed thru the conjunctiva.

Under cocaine and adrenalin anesthesia a point is selected over the insertion of the muscle on the side of the globe toward which the eye turns, and an incision made thru the conjunctiva parallel with the equator. Tenon's capsule is then picked up and incised and the sclera exposed. A tenotomy hook is inserted with its rounded end pressed against the side of the eyeball and introduced underneath the muscle. This muscle is then brought up thru the incision, cut off close to its attachment, and permitted to slide back. The edges of Tenon's capsule are grasped and included in the suture which is now introduced thru the conjunctiva to close the wound.

Next, on the opposite side of the globe an incision is made thru the conjunctiva and Tenon's capsule at a point over the insertion of the opposing rectus, at right angles to its direction, sufficiently large to expose it for a number of millimeters of its length.

The rectus is brought up by means of a tenotomy hook in the usual way, and after it is exposed, another hook is

introduced beneath it so that it may be freed from underlying and adjacent tissues for about ten millimeters of its length, by a gentle pulling on either hook in opposite directions.

The muscle is now held away from the globe by the hooks and its under surface gently roughened with a scalpel. This is done so that the finally approximated surfaces of muscle will adhere. It should be thoroughly done and is an important step in the technic.

With the tenotomy hooks still holding the muscle away from the globe, it is split down its middle in the direction of its fibers with a small knife or scissors (Fig. 2), for a distance corresponding approximately to an amount slightly in excess of deviation of the strabismus in millimeters as determined by previous measurement. Care must be taken not to tenotomize or sever the muscle.

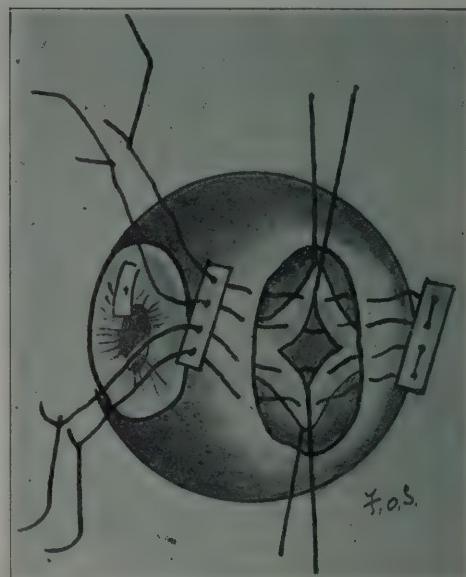


Fig. 4.—Shows sutures on plate passed thru the conjunctiva, looped muscle portions, thru the conjunctiva of the opposite side and then thru the second gold plate, ready for tying.

The needles of the previously described and prepared sutures are introduced thru the conjunctiva next to the posterior border of the incision (Fig. 3).

The split portions of muscle are

now held apart by two pieces of suture silk passed thru the cut and manipulated by an assistant. Gentle tension is made upon them to separate the two parts of the muscle in such a way as to have the pull directly at the center of each portion of muscle so that when the sutures are introduced in the next step, there will be an equal amount of muscle tissue on either side of the loop.

The next step is to pass the needles in their respective order thru the conjunctiva from its scleral surface to the outside at the anterior border of the incision and then thread them thru the second gold plate.

The sutures are now pulled up taut and the outermost one on either end is tied with the one immediately next to it. The plates should now be one

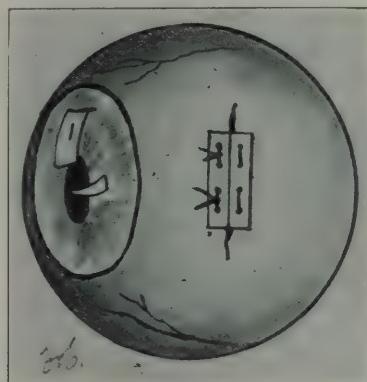


Fig. 5.—Final position of plates with wound closed and muscle shortened after sutures are tied.

There have now been formed, above and below two angles of rectus tissue, the degree of angle depending of course upon the pull exerted upon the silk, which is in the apex of either angle. The outermost needle, above or below, is now introduced thru the muscle near the apex of the angle and then thru the muscle tissue of the other side, at a point opposite to where it pierced originally.

The suture next to the above is put thru a similar procedure with the exception that it is introduced thru the muscle at a point near the beginning of the slit and pierces the tendon at its insertion.

The remaining two sutures are disposed of in the same manner, the outer one first, thru the other loop of muscle.

next to the other, and exert an action similar to a clamp on the looped muscle. The silk threads, holding the muscle angles, are now removed by pulling one end of each. No further suturing of the conjunctiva is necessary. The roughened scleral surfaces of each loop have been approximated and are held in firm position by the sutures and plates. Both eyes are bandaged for eight to ten days, after which the unoperated eye may be left open, and the plates removed with their sutures twelve days after operation.

Both eyes may be left uncovered as soon as the conjunctiva has closed over, following the removal of the plates.

RETINAL ANGIOSCLEROSIS*

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The pathology and ophthalmoscopic appearances of angiosclerosis of the retina are here summarized. The significance of retinal vascular disease is brought out, and six illustrative cases are reported. Read before the Wisconsin Surgical Association, Marshfield meeting, May, 1921.

The distribution of angiosclerotic changes in the body is very irregular and uneven. Altho these changes may be found quite generally, they are frequently found closely limited to one or more organs or to one area, or even to a single vascular system within one organ; and when so found, are not to be regarded as a disease in itself of that part but as the local manifestation of a combination of general disturbances, all of which are not clearly understood.

The presence of sclerotic changes in the retinal vessel is therefore evidence of the existence of remote causes, and it is principally for its general diagnostic and prognostic value that the careful study of the retinal vessel is important.

ETIOLOGY.

Angiosclerosis is probably the result of no single agent; no age is exempt, altho it is rare in infancy and childhood and common in advanced age. It is more frequently encountered in men than in women, and in the muscular and hard working more than the feeble. It is a common accompaniment of syphilis, gout, rheumatism, diabetes, lead poisoning, and especially nephritis. As an etiologic factor, the now popular focal infection must be considered and, I believe, plays no small part by constantly feeding bacteria and toxins into the blood stream. Acute infections, especially typhoid, may be followed by vascular degenerative changes.

Arteriosclerosis and hypertension are usually found together, altho either exists without the other; however, where one exists alone, eventually the other makes its appearance. As to which is primary, there is some doubt, the prevailing opinion now being that high blood pressure precedes arterial changes,

the latter being a compensatory or strengthening process against the increased intravascular tension. The fact that retinal angiosclerosis may be found in the absence of hypertension is evidence that the latter is not in all cases primary.

With advanced age vascular change is almost constantly found, probably the result of many factors; the amount of wear and tear to which the individual has been subject, his manner of living, number of infections, etc., and also the quality of arterial tissue he has inherited.

The three greatest causes of sclerotic changes in blood vessels are:

1. Intoxications.
2. High blood pressure.
3. Senility.

PATHOLOGY.

Pathologic changes. In practically all cases, disease of the retinal vessels, begins in the intima of the arteries, rarely in the veins. The earliest change according to Thoma¹ is a relaxation of the arterial walls due to a loss of elasticity and contractility. In the retina this results in an elongation, which is compensated for by tortuosity. This early relaxation is most manifest in the terminal vessels. The thinning of the vessel walls is soon arrested by a proliferation and thickening of the intima, and what Coats² considers a new tissue is found on the inner aspect of the elastica and encroaches upon the lumen in an uneven and eccentric manner; this tissue consists mainly of elastic fibers. The endothelial lining usually remains quite normal, altho there may be a proliferation of endothelial cells, which takes place very unevenly and results in the formation of nodes, which also encroach upon the lumen. It is probable that this endothelial proliferation at times takes place with very little

*From the Marshfield Clinic, Marshfield, Wis.

other change in the vessel walls. As the condition advances, proliferative changes may take place in the muscularis and adventitia; and as in the intima, the new tissue is mainly elastic. As before stated, changes in the veins occur with few exceptions later than in the arteries and are essentially the same; in the last stages the new tissue becomes so abundant that it may completely obstruct the lumen. Degenerative changes intervene; the stroma takes on a hyalin appearance or may break down, resulting in the formation of cavities filled with granular debris and occasionally cholesterolin crystals. The cells may become greatly swollen and molded together. These degenerative changes appear first and to the greatest degree in the outer layers and are accounted for by insufficient nourishment, the cells being cut off from the blood stream by the thick, proliferated, new tissue.

In considering the *ophthalmoscopic appearance* of retinal vascular change, one must constantly bear in mind that normally it is but the blood column that one sees; and it is only in abnormal or pathologic conditions of fairly marked degree that the vessel walls are seen.

The ophthalmoscopic picture of *hypertension* in the absence of arteriosclerosis is given by Bardsley³ as follows: 1. The vessels have an appearance of uniform distension and fullness. 2. The light streak is broadened out, is much brighter than normal, the brilliancy increasing with increase of tension until it has a copper wire appearance (not silver wire as in sclerosis). 3. The tight arteries indent the veins.

Adams⁴ lays great stress upon the following point: Where an artery crosses a vein in a normal patient, the light reflex of the latter is continuous practically up to the artery; but if the pressure is raised there is an absence of light reflex for some short distance up and down the vein.

The changes of *angiosclerosis* may occur in nearly all the retinal vessels, but perhaps more frequently, a single vascular system or even a single vessel may be diseased. The first changes are

a dilatation, tortuosity and pulsation of the arteries. As a result of loss of elasticity and contractility of the artery walls, they become longer, broader and more flaccid, and the artery assumes a tortuous course. The pulsation is not always seen; it is not the type seen in glaucoma but is a slight lateral movement of the whole vessel and is most marked in the bends. This pulsation disappears later; but when seen in association with tortuosity, is almost pathognomonic of early arteriosclerosis (Raehlmann⁵). The arterial light streak becomes broadened and brighter, taking on a silvery appearance. These early changes are first manifest in the terminal vessels, and small vessels which formerly were invisible come into view. This is especially noticeable on the disc where the distended capillaries give it an even redness; these capillaries, extending over the disc margin, may blur its outlines to a slight degree so that the combination of redness and obscured outlines may give the appearance of a very early papillitis. The change in the light streak, tortuosity, and pulsation may often best be seen in the macular artery which extends directly across the disc temporally to the macular region.

The thinning and relaxation of the vessel walls is soon arrested by the hyperplastic process described above, which begins the stage of vascular rigidity. The ophthalmoscopic features of this stage are as follows:

1. Changes in color of vessel. The arteries are lighter in color than normal and the light streak is brighter, broader, and extends unusually far into the periphery. When this brightness of the light streak is pronounced, the arteries are spoken of as "silver wire arteries."

2. Opacities in the walls. Opacities cause loss of transparency and visibility of the vessel walls. This is first and best seen where an artery crosses a vein; long before the opacity is visible an underlying vein is lost to view a short distance each side of the artery. As the opacities become more marked, the blood columns are bordered by

light colored lines which range from a semitransparent cloudiness to sharply defined white lines on each side of the vessel. These changes are most pronounced in the large vessels on the disc and must be differentiated from the congenital prolongations of connective tissue extended inward from the lamina cribrosa. Opacities as

arterio sclerosis it is 2 to 4 or less. There may be localized constrictions of the arteries, where the blood column is still further reduced; according to Raehlmann⁵ these are due to nodular endothelial proliferations. (Endarteritis nodosa). Whereas narrowing is the rule with the arteries, dilatations are more common with the veins, the

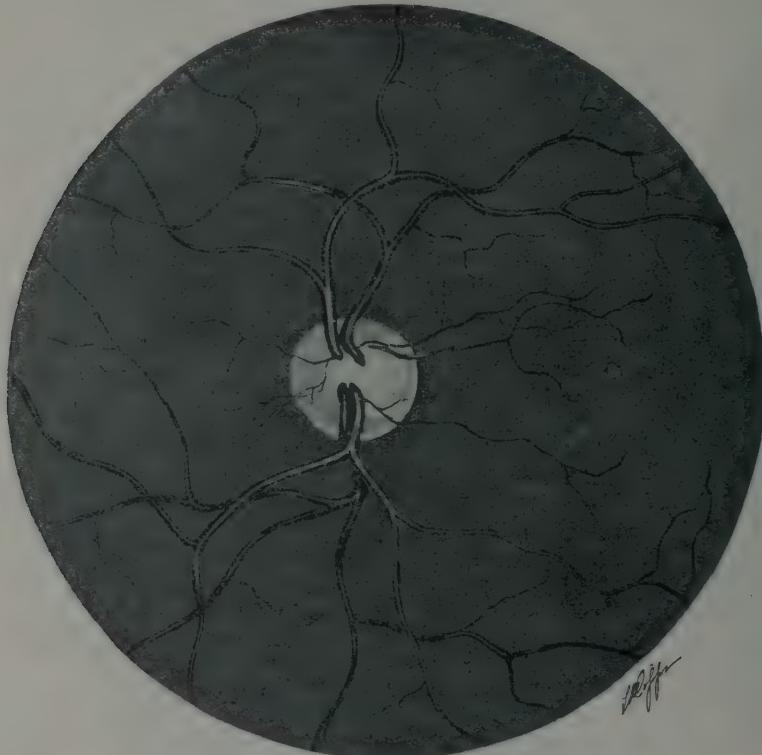


Fig. 1.—Ocular fundus in angiосclerosis, left eye of Case I. (See p. 816.)

dense as these; if caused by sclerosis, would almost invariably be accompanied by pathology of the vessels elsewhere in the retina.

3. Irregularity in the size of the blood column. As the proliferating intima encroaches upon the vessel lumen, it causes an uneven narrowing of the blood stream; this attenuation of the blood column is seen in the arteries and is very constant and, when associated with a reddened disc, is good evidence of angiосclerosis.

The normal ratio of artery to vein is given variably as 2 to 3, or 3 to 5. In

smaller venous twigs, especially, become distended, tortuous and apparently increased in number, and may have a corkscrew appearance. As the disease advances, there is a tendency for tortuosity to decrease in the arteries and increase in the veins.

4. Distortions at arteriovenous crossings. Normally, where an artery crosses a vein, the angle between them is not altered at the crossing. In the more advanced stages of sclerosis, the vein is diverted so as to lie along side of the artery for a short distance each side of the crossing. In the earlier

stages of sclerosis, the underlying vein is not indented but merely lost to view a short distance each side of the artery, as above described. As the artery becomes more rigid, it actually constricts the blood column in the vein so that it appears to be indented. This constriction leads sometimes to an ampulliform dilatation, just distally to the

calized edema, especially about the disc, is not so uncommon. When present and associated with the redness of the disc above mentioned, it closely simulates in appearance papilledema; and when edema is present in the disc, there is an actual papilledema, which has no cause other than the vascular disease. Retinal exudate may be pres-

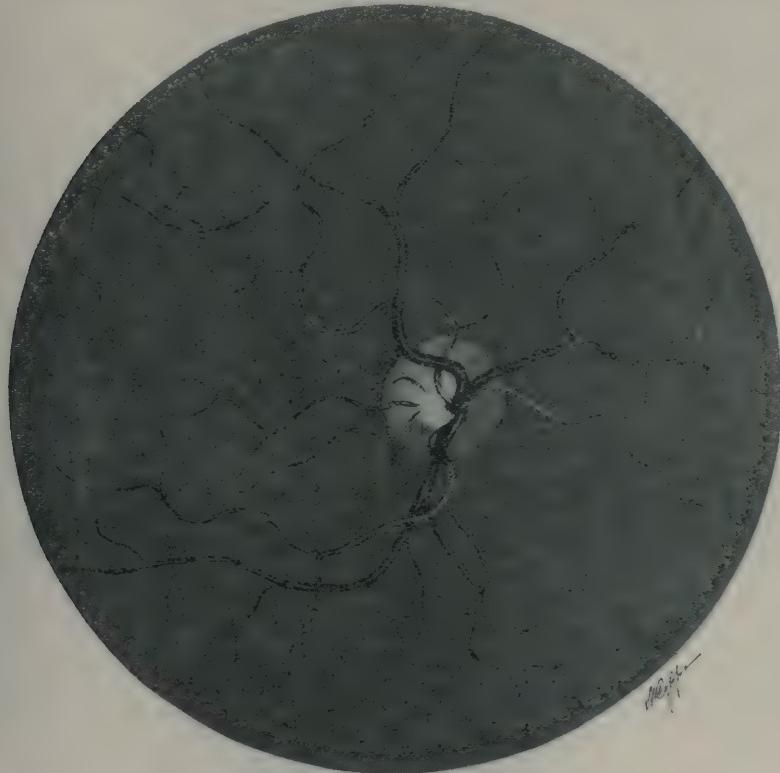


Fig. 2.—Fundus of right eye Case 2. (See p. 816.) Macular artery very tortuous.

artery and frequently to tortuosity more distally. Due to flattening of the vein, there is a loss of its light reflex for some distance each side of the crossing. The pointed appearance, often seen, is an optical effect due to the gradual obscuring of the vein by the thick arterial wall. A condition called "banking" is not frequently seen; it is a damming back of the venous blood stream with consequent dilation of the vein distally and narrowing proximally.

5. Edema of the retina. Generalized edema is not commonly seen; but lo-

calized edema, especially about the disc, is not so uncommon. When present and associated with the redness of the disc above mentioned, it closely simulates in appearance papilledema; and when edema is present in the disc, there is an actual papilledema, which has no cause other than the vascular disease. Retinal exudate may be pres-

ent in the form of small discrete white spots, usually not numerous, having no pigment disturbance. These may be grouped about the macula and may give the appearance of mild albuminuric retinitis.

6. Clouding of vitreous. This is a condition not described by most authors and may be dependent upon factors other than sclerosis, altho it is frequently found in the more advanced cases. It takes the form of a very fine haze over the disc and surrounding retina, obscuring the clear view of the vessels and accentuating

the red appearance of the disc, the latter at times appearing almost as red as the setting sun seen thru the low haze of a dusty summer day.

7. Retinal hemorrhage. Bleeding is not common in the early stages of sclerosis; but in the advanced, there may be small retinal hemorrhages, few in number, usually near the smaller

changes in the retinal blood vessels, for the interpretation of general vascular disease and especially of cerebral vascular disease, cannot be over estimated.

In general arteriosclerosis, changes in the retinal vessels are frequently present. In 210 cases of arteriosclerosis, Raehlmann found retinal changes in nearly 50%. These findings



Fig. 3.—Fundus of right eye in Case 3 (p. 817). Upper veins greatly indented where arteries cross them.

veins, sometimes on the disc, and rarely at the macula. Less commonly, larger retinal or vitreous hemorrhages are seen.

8. Optic atrophy. With advanced arteriosclerosis, atrophy of the nerve may be seen; this may be due to insufficient nourishment because of endarteritis in the central artery or to pressure on the nerve of sclerosed ophthalmic or internal carotid arteries.

SIGNIFICANCE OF RETINAL VASCULAR DISEASE

The importance of ophthalmoscopic

check up quite closely with those of other investigators. Just as sclerotic changes may be found in a single vessel or vascular system in the retina, there may be a broader limitation to one or more organ or area in the body and we may have a fairly well marked sclerosis of the blood vessels in the brain before changes occur elsewhere; or the change in the cerebral vessels may be far in advance of any other. The angiosclerotic processes may be very irregular in distribution in this organ as in any. The ocular circulation must be regarded as a part of the

cerebral system, just as the nerve is a prolongation of the brain; and disease of the retinal vessels is very good evidence of the existence of the same condition in the brain. Due to the irregular distribution of sclerotic processes, any area of the brain or the whole retinal system may escape so that the absence of retinal vascular

Of seventeen cases quoted by Gunn, seven had moderate or severe retinal arteriosclerosis, three slight, and seven none.

Of one hundred and fifty-six cases of retinal sclerosis seen by Adams⁴, the cause of death was definitely known in forty-nine; and of these twenty-two died of cerebral hemorrhage.



Fig. 4.—Left ocular fundus of Case 4 (p. 817). Great changes in vessels. Blood column narrowed in lower temporal artery. Veins full and tortuous.

change is not proof of its absence in the brain. Knapp⁸ says, "The presence of sclerotic changes in the retinal vessels presupposes with certainty a similar state in the cerebral vessels, but not the reverse."

Of seventeen cases of distinct retinal arteriosclerosis studied by Gies⁶ death occurred in all from apoplexy within four years.

Of forty-four cases of cerebral thrombosis and hemorrhage reported by Foster Moore⁷, 43% had advanced arteriosclerotic retinitis, 27% mild or moderately severe, and 30% had none.

These statistics leave no doubt as to the interrelation between vascular disease in the eye and the brain, and throw much light upon the prognostic significance of the former.

As to the significance of retinal hemorrhages, Knapp⁸ says that when they are not due to local disease or other conditions, especially with increased blood pressure, they have serious prognostic significance.

The presence of a cloud or haze in the vitreous has indicated, in my experience, an increase of toxins in the blood stream; albumin is frequently

present in the urine. Energetic eliminative procedures result in betterment of vision and reduction of the haze.

The cause of "obscurations" is not determined, altho it is probably a vessel spasm. They may be the forerunners of permanent loss of sight.

In conclusion, I wish to present a few cases, more for their usual than

Eyes:—Disc normal. Narrow temporal conus. Arteries full, correspond in size with veins. No tortuosity, arterial light streaks broadened and unbroken, extending into periphery. Veins also full, light streaks brightened, not tortuous. Superior retinal artery indents nasal vein deeply; at other crossing there is less indentation,



Fig. 5.—Right ocular fundus, Case 5 (p. 818). Vitreous haze; nasal margin of disc blurred. Great vascular change.

unusual character. With the exception of Case II., the underlying conditions were found by first detecting the retinal changes. For the sake of brevity I have omitted the external ocular examinations.

CASE I. Mrs. L. S. Age. 34. Housewife. Severe headaches, mainly frontal, but pain also at vertex and occiput. Headaches usually made worse by near use of eyes, but frequently present without. Has some pain every day. No severe illness. Works very hard. Three children. No miscarriages.

but venous light streak disappears some distance each side of artery.

Nose, sinuses negative. Tonsils slightly infected. Large goitre. Heart slightly hypertrophied. Lungs, abdomen, extremities negative. Urine normal. Blood chemistry normal. Blood pressure: systolic 240, diastolic 150.

CASE II. T. K. age 34. Prize fighter. Elevated blood pressure found during examination before a fight. Has no complaint. Eats heartily. Works and trains vigorously.

Eyes:—Both discs distinctly red-

dened. Margins clear. Arteries narrow. (A:V::2:4) and tortuous. Arterial light streaks brightened. In the right, the macular artery is very tortuous; and the inferior temporal artery indents vein slightly. No pulsation seen. Veins full, venous light streak ends some distance each side of artery at crossings.

Fine general condition. Nasal sep-

clear. Veins full and tortuous. Arteries pale, narrow (A:V::2:4) Arterial light streaks very bright (silver wire). In the right both superior retinal branches indent veins at crossings. Right inferior nasal artery very tortuous.

Blood pressure: systolic 150, diastolic 110. Urine: Trace of albumin and few hyalin cast.



Fig. 6.—Fundus of right eye, Case 6 (p. 818). Disc margin blurred and disc protruding 1 D. Striking vascular changes.

tum thickened, sinuses negative (X-ray). Tonsils slightly hypertrophied and infected. Heart hypertrophied (electrocardiogram). Urine negative. Blood chemistry normal. Blood pressure: systolic 160, diastolic 110.

CASE III. Mrs. W. H. age 46. Housewife. Complains only of feeling of irritation in left eye since having a foreign body in it three weeks previous. No headaches. Lower eyelid at times puffy.

Eyes:—Disc reddened, margins

CASE IV. J. M. age 60. Business man. Severe attacks of vertigo, come on when walking or exercising. Never falls, but thinks he will, feels very weak for an hour or more after each attack. Occasional mild headache. History, negative. Eats heartily. Drinks moderately.

Eyes:—Both fundi show marked vascular change, most pronounced in left. Left disc margins blurred, arteries narrow and very uneven in caliber, white opacities visible in walls, especially

where arteries cross veins and in inferior temporal artery, where in one place shortly distant from the disc, the blood column is reduced to a narrow thread. This artery deeply indents the inferior nasal vein which has an ampulliform dilation distally to the crossing. Veins are full and tortuous, especially the smaller branches. All vessels on the disc are bordered with white lines.

General: Full blooded, quite stout. Nose negative. A full dram of pus expressed from right tonsil. Heart, lungs, extremities negative. Urine negative. Blood pressure: systolic 146; diastolic 96.

Note:—This case is an excellent example of localized (undoubtedly cerebral) arteriosclerosis, far in advance of general vascular disease.

CASE V. F. T. Age 52. Traveling salesman. Headaches, more or less constant, frontal and occipital, aching in neck, two months duration, altho much worse the last week. Blurring of vision two weeks. Past history: negative. Lives well, heavy eater. 4-8 cigars daily. No alcohol.

Eyes:—Both fundi much alike. Right: a very fine haze in the vitreous over and around the disc, cannot see vessel outlines clearly. Nasal margin of disc blurred and nasal $\frac{1}{2}$ elevated slightly. Disc hyperemic. Arteries narrow, pale, tortuous, slightly uneven

in caliber, have bright silver wire light reflexes. Veins large and full, also slightly tortuous and deeply indented by arteries.

Large man, weight 196 pounds. Full blooded. Urine: trace of albumin, no casts (this was constant in repeated examination). Blood pressure: systolic 214, diastolic 120. Blood Wassermann negative (2 tests) Spinal fluid negative. Perimetric field negative.

Note:—After brisk catharsis vision improved from 0.8 to 1.0 in each eye and headaches disappeared.

CASE VI. Mrs. A. J. Age 38. Housewife. Attacks of vertigo, come on suddenly, usually when working. Headaches. Vision decreased last few months.

Eyes:—Both fundi similar. Left: Slight haze in vitreous over the disc. Disc margins much blurred and disc elevated one diopter. Arteries small, pale, and tortuous, bright silver wire light reflexes, arterial walls visible at venous crossings. Veins large and full, tortuous and deeply indented by arteries, this is very striking, nasally to the disc where two nasal arterial trunks cross a vein close together.

Large, well looking woman. Physical negative. Urine: trace of albumin. No casts. Blood pressure: systolic 180; diastolic 110. Blood Wassermann negative. Spinal fluid negative. Perimetric field normal.

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EYE FINDINGS IN BRAIN INJURIES

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This paper brings together a summary of the ocular conditions likely to be found in connection with brain injuries with some mention of other symptoms frequently associated with them. It was read before the Wisconsin Surgical Association, at the Marshfield meeting, May, 1921.

The ocular changes attendant upon injuries to the head and brain are important factors, when studied in conjunction with the general symptoms, in estimating the extent of the injury, in aiding in localization and in determining the treatment.

Their manifestation may result from: increased intracranial pressure, from actual destruction of, or injury to the cortical visual centers or the visual tracts, or from general or localized meningitis or cerebral infections. The extraocular expressions of these injuries are muscular paresis, paralyses and conjugate deviations. The intraocular are choked disc, optic neuritis and retinal hemorrhages of all grades.

The visual center and tract manifestations are expressed in defects of the visual fields varying from small unilateral scotomas to bilateral total loss of the fields or blindness. It is deemed inadvisable in this paper to attempt any discussion of the ocular findings from war injuries of the head and brain. Mention will be made only of those cases which possibly parallel industrial or civil brain injuries.

The advance made in the knowledge of cerebral localization as a result of the number and variety of war wounds of the head and brain will be of great assistance in the localization and treatment of civil brain injuries.

Nystagmus may result from injury to the occipital region probably due to the nearness of the labyrinth, the cerebellum and medulla. This symptom however, is not common except in penetrating wounds of the brain. Nystagmus has also been observed following war injuries of the parieto-frontal region and can only be understood on the ground of direct injury to the frontal center of coordinate movement. There seems to be no uniform relation between the direction of

the ocular movement and the side injured. Nystagmus as a rule disappears either spontaneously or after operation.

Disturbances of motility are rather infrequent following brain injuries, and are rarely permanent. The abducens and trochlearis are most frequently affected. The impaired or lost function may be due to fracture of the base; to basal meningitis or hemorrhage; but is generally considered as due to marked rise of intracranial pressure.

Holmes and Sargent¹ remark on the comparative rarity of ocular palsies in gunshot wounds of the head; an exception being those cases of wounds of the sinuses and particularly wounds of the superior longitudinal sinus and its tributary lacunae. Injuries of this character are much less common after thru and thru perforations than after tangential wounds with depressed fracture, or fissures of the skull in the mid line.

In these cases Holmes and Sargent attribute the symptoms wholly to circulatory stasis, the result being profound cerebral edema from occlusion by thrombus, or by pressure of depressed bone, of the intermediary channels between the sinus and the superior cerebral vein. The remarkable tendency to recover, in uncomplicated cases, is probably due to the free venous anastomoses.

The value of the pupil as a factor in the diagnosis of brain injuries has been greatly overrated as the appearance and activity vary greatly depending upon the nature and location of the trauma of the brain.

There is usually miosis early, the result of the concussion, followed by mydriasis. Anisocoria may be present or there may be miosis if there is hemorrhage into the pons, cerebellum or ventricles. Occasionally hippus may be present and, rarely, Argyll-Robertson pupils. The reaction to light is fre-

quently sluggish. The Wernicke reaction test is beautiful in theory, very difficult to properly apply and, according to Walker, "there is no evidence that the hemiopic pupillary reaction has any topical value."

Horsley considers that mydriasis, in cases of traumatic brain pressure, occurs immediately when the intracranial pressure exceeds the blood pressure and depends upon; (1) a central conditional stimulation of the sympathetic; (2). a simultaneous diminishing of the sensitiveness of the oculomotor.

It is only within the last decade that the appearance of the eye ground, as revealed by the ophthalmoscope, has been utilized as an index of intracranial tension. Investigation and research have determined that thru the eye we have two valuable means in diagnosing increased intracranial tension, i. e., the condition of the eye grounds and the character of the visual field as determined by the perimeter. As a result no examination of a case of suspected brain lesion is complete without a thoro examination of the ocular fundus and a determination of the visual field.

There is a diversity of opinions as to the pathogenesis of the intraocular changes found in increased intracranial pressure. All, however, hinge on the toxic, the inflammatory and the mechanical theories.

Schulten, Bramwell, Oppenheim, Hoche, Merz, Brau, Cushing, Bordley, Uhthoff, Axenfeld and Kampfferstein all practically agree on the mechanical theory.

The inflammatory theory is upheld by Leber, Deutschmann, Kries, Gower, Elschnig, Jacobson and Flemming.

Relative to the pathogenesis of choked disc de Schweinitz says "in general terms it is probable that choked disc is produced by a combination of factors. In this combination increased intracranial tension or pressure is most prominent, and the mechanical theory of its pathogenesis affords the most satisfactory explanation."

The intraocular changes seen after head injuries are frequently found with-

in a few hours following the trauma, and can hardly be explained on any other hypothesis than the mechanical theory. Even in those cases in which the changes in the eye grounds do not make their appearance for several days the mechanical theory holds good.

Further, in cases of brain injury accompanying basal fractures with free outlet of the fluids in the skull no visible changes as a rule take place in the eye ground as long as the drainage is maintained. This was not the rule in war injuries as a large percentage showed papilledema or optic neuritis at some stage of their existance. This is easily accounted for by the greatly increased trauma to the brain tissue in war wounds.

It is a noteworthy fact, that in many cases of intracranial injury with marked general symptoms, there will be no visible changes in the eye grounds; again, the ocular manifestations will differ in the two eyes. The same rule applies in cases of neoplasms of the brain, choked disc being found in only about 80% of brain tumors. No satisfactory explanation has been offered to account for this fact.

It has occurred to the writer that a possible explanation may be found in the results obtained by Parker² in his experimental work on "The Relation of choked disc to the tension of the eyeball."

May it not be possible that in cases of brain injury with marked general symptoms, in which no changes are manifest in the eye grounds, the intraocular tension is sufficient to counteract the effects of the intracranial pressure?

Another possible factor may be the location of the injury in the brain substance. It is well known in cerebral neoplasms, that the tendency of tumors to produce choked disc increases from the anterior to the posterior pole of the brain and diminishes from the cortex inward. Thus the topographic location of the injury may be a determining factor as to whether or not changes will take place in the eye grounds.

The age of the individual may have

some influence in intracranial injuries, as it is an important factor in brain tumor choked disc; youth being much more liable to intraocular changes than age. This may be due to the fact that the ocular tissues are less yielding in age than in youth and therefore may be a factor in resisting the mechanical effects of the intracranial pressure.

Parsons³ states "any intracranial condition which impedes the flow of blood in the internal carotid may be expected to lead to passive constriction of the intraocular arterioles; but such intracranial conditions usually affect the venous sinuses even more profoundly, leading to partial blockage, with coincident slowing of the circulation. This latter effect, however, will not necessarily lead to increased ocular venous pressure, owing to the free communication with the general system of veins, which themselves anastomose so freely as to tend rapidly to the equalization of pressure." It is not without the bounds of reason to suppose that in certain individuals there may be an anomalous more free communication between the external carotid and the vascular supply of the eye, as in the lower animals, which will overcome the effect of intracranial pressure on the internal carotid in leading to passive constriction of the intraocular arterioles.

Bollack⁴ in a recent article possibly throws some light on the subject in the statement, that the anatomic findings and the clinical facts show the constant presence of ventricular hypertension and dilatation in the course of tumors accompanied with choked disc; and that dilatation of the third ventricle is always followed by choked disc while dilatation of the lateral ventricles is only occasionally so followed; and that tumors situated in the posterior portion of the brain and in the cerebellum in particular are most apt to cause dilatation of the ventricles.

In other words Bollack concludes that with the intimate embryologic, histologic and anatomic connections between the third ventricle and the chiasm, ventricular dilatation plays an

important role in the production of intraocular changes. He also states that ventricular hypertension is the cause of ventricular dilatation, but that the latter has not necessarily any connection with intracranial hypertension, altho it undoubtedly plays an important part in the origin of the syndrome in which choked disc is a symptom. Supposing such to be the fact, it is probable that certain brain injuries with increased intracranial tension would not cause sufficient hypertension and dilatation of the ventricles to be a factor in producing intraocular changes.

Why increased intracranial pressure, per se, does not always make itself manifest in intraocular changes is an interesting problem to ophthalmologists. In the great majority of instances it is certain that after decompressive measures in those cases with choked disc and the general symptoms of increased intracranial tension, there is a marked change in the appearance of the eye grounds, which, if the pressure has not existed too long, may resume their normal appearance.

The intraocular changes observed by the writer in cases of brain injury have rarely reached the third stage of choked disc but have usually been those of the first or second stage. The few exceptions were seen during the war. These were peculiar in that they were furrow wounds of the scalp with the outer table of the skull intact and were usually of the vault. No operative treatment had been given other than *débridement* of the original wound.

There were the symptoms of increased intracranial tension but the surgeons decided against operation on the ground that there was no depressed fracture, X-ray findings were negative, the symptoms were not alarming and visual acuity was not affected. Examination of the eye grounds showed marked evidence of choked disc, with swelling varying from 1 to 3 D. Operation was advised and on opening the skull it was found that the inner table of the skull was comminuted, under the furrow made in the scalp by the bullet, for a distance of 1½ to 2 fingers width with marked breaking down

of the brain tissue, altho the dura was intact.

It was not my fortune to follow up these cases as they were evacuated too promptly, but it is presumable that there was a recession of the choked disc after operation.

Jessop⁵ calls attention to the large proportion (72% in 47 cases) of patients showing choked disc with gunshot wounds of the vault of the skull. The swelling of the discs in most cases was slight, generally 1 D., seldom more than 2 D. Both discs usually affected and other ocular symptoms rarely present, color sense and visual fields intact. On relief of intracranial pressure the eye changes subsided in 5 to 6 days.

The visual fields for form and color under normal conditions have a fixed relation with each other, the white or form field being the largest, the blue next in size, followed by the red, the green being smallest.

The fields of vision in brain tumor differ with the situation of the lesion and vary with the increase and decrease of pressure. Fields taken daily by the same observer show marked daily variations. This variation in the fields is also observed in head injuries, depending upon changes in intracranial tension, due to pressure from blood clots or edema of the brain tissue. Following contusions, especially tangential in character, as bullet wounds, and penetrating injuries over the occipital poles of the brain in which there has been laceration or actual destruction of the brain tissue, all manner of transitory and permanent defects in the visual fields will be found.

Mills⁶ states the striking feature of occipital injuries is that the principal defect is visual rather than nervous. Immediate unconsciousness, of momentary or of considerable duration, follows the injury, but when control returns, blindness of all degrees remains. Unless there has been a direct bilateral lesion of both visual cortical centers, the early more or less complete blindness which follows so many of these occipital injuries resolves into one or

another form of hemianopsia, or, as in a few cases, into complete restoration of vision, without discoverable defects in the visual fields. In these cases of initial total or relative blindness, the later restoration of vision depends upon the subsidence of the constant reactive edema of the contused cortex or subcortex, the absorption of cortical capillary hemorrhage, the contraction and organization of meningeal clots, or it may be explained on v. Monakow's last theory of diaschisis. According to Jessop⁷ in this conception the shock of the injury to one side of the occipital area of the brain is transmitted by commissural fibers to the corresponding area on the opposite side, as each area represents the cortical projection of half the field of vision in each eye, the immediate effect is blindness. When the shock and its physical effects pass off, the center on the side opposite to the lesion generally recovers completely, leaving permanent and usually more or less symmetric residual defects in the visual fields.

Genet⁸ who made a systematic examination of all projectile wounds of the head during the war, regardless of their degree, concludes that determination of the visual fields is necessary in all cases of occipital trauma, regardless of their apparent triviality, as a large proportion of field defects will only be discovered when sought. The fields should be examined frequently in cases of hemianopic scotoma as the increasing size of the field defect may be the first indication of the pressure and enlargement of an occipital abscess.

Under civil accident neurosis we find:—First, fields that represent true hysteria or neurasthenia features connected with cases in which there may be no actual disorganization of tissue but representing a psychic, hysterical or neurasthenic element induced by the accident itself. Second, fields that in the eye itself, or in other parts of the same apparatus, represent some demonstrable or nondemonstrable lesion.

In cases where the eye changes show the 2nd and 3rd stage of choked disc

there will be found enlargement of the blind spot from impingement of the swollen tissue on the nerve fibers contiguous to the disc. Central visual acuity is rarely permanently affected in the brain injuries occurring in civil life. The exceptions being in those cases of injury to the occipital region in which depressed fractures or clot pressure inhibit the cortical visual centers. Restoration of function is usually complete upon relief of pressure.

Cortical blindness is the direct result of a bilateral lesion of the visual cortical centers, usually a perforation of both centers by a bullet. It usually persists unmodified, and if vision of any sort remains or returns, it seldom exceeds a vague sense of luminosity or at best an exceedingly contracted field of distinct vision.

The above described ocular findings are frequent as manifestations following brain injury. But as above stated

choked disc may be absent throughout the entire course of a cerebral lesion with marked objective symptoms.

Examination of the eye grounds should always be a part of the routine of the examination of any case of head injury, and the determination of the visual fields when possible. When choked disc is found together with other symptoms of increased intracranial tension, operative interference is imperative. The relief of pressure in practically every instance prevents consecutive atrophy of the optic nerve when done in time. The finding of the symptoms of choked disc without other symptoms of intracranial pressure is not sufficient indication for operation, unless the intraocular manifestations are progressive in character; on the other hand the absence of choked disc should in no wise preclude operative interference when other symptoms indicate its necessity.

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CAUSES AND PREVENTION OF BLINDNESS

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This statistical study of the causes of blindness is made from a wide range of material and several different points of view. The various causes are also discussed from the practical standpoint of guarding against them. Read before the Section of Ophthalmology of the British Medical Association at Newcastle, July, 1921.

We need a sound knowledge of the causes of blindness else we cannot take effective steps to prevent blindness. We need to prevent blindness because of the cruel hardships it entails upon the blind person, and because a blind person is directly or indirectly a heavy charge upon the resources of the community. To present a true picture of the causes of blindness we should need a recurring census of the blind taken by expert practitioners. Failing that, I present figures which will, I think, give such a fair impression of the causes as to allow of just deductions as to the measures for prevention. My figures come from three sources; (1) A home for blind infants; (2) the schools for the blind and partly blind of the London Education Committee and (3) private case books. They relate to 4,288, patients in all.

BLIND INFANTS

The home for the blind infants is under the care of the National Institute for the Blind. It has only been recently opened. So far there have been presented for examination sixty-three babies. They come from all parts of the country, all are quite young, mostly babies in arms. The causes of blindness found may be grouped under: I, surface inflammations, II, inflammations within the eyes, III, congenital defects.

GROUP I, Surface Inflammations of the Eyes, contains 36 cases. Of these 31 are due to ophthalmia neonatorum, and 5 to purulent conjunctivitis of later months. Of the 5 latter cases, one lost the sight during the third week of life; the cause is not known, but from the history I should judge that there had been a streptococcal infection and a particularly destructive inflammation. Scarlet fever, diphtheria and measles accounted for one

each, and one was due to an unknown cause.

GROUP II, Inflammations Within the Eyes, contains 7 cases. Two were due to iridocyclitis of great severity, one to cerebro-spinal meningitis, and the other probably to the same disease. Five were due to optic atrophy or defect; one followed meningitis; another probably arose from the same cause, for there is no hydrocephalus; two appear due to intracranial defect, and one to a cause unknown.

GROUP III, Congenital Defects. The cases number 19; the conditions are as follows:

Anophthalmia	2
Microphthalmia	4
Microphthalmia with congenital cataract	3
Congenital cataract	3
Albinism	1
Nystagmus	1
Buphthalmia	1
High myopia	1
Malignant disease (glioma)	2
Defect of the cornea	1

The cataracts have been operated upon, but at best vision will be very poor. The case of high myopia is of interest; in the right eye myopia is 12 D., left 5 D., there is rapid nystagmus, fixation is doubtful; the myopia was found to exist at the age of nine months.

There is one case of blindness due to accident, the child was burned, and both eyes were lost.

TABLE OF BLINDNESS.

Cause	No.	Percentage
Purulent conjunctivitis (36) :		
Ophthalmia neonatorum.....	31	49.2
Of later months.....	5	7.94
Inflammations within the eye	7	11.11
Congenital defects	19	30.14
Accident	1	1.6
Total	63	100

BLIND OR PARTLY SIGHTED SCHOOL CHILDREN.

For the past seventeen years I have had oversight of a number of London

schools for the blind. There are six day centers for the blind accommodating 211 children and two resident schools for the older children accommodating 116. There is a large and growing provision of "myope classes" for the partially sighted in thirty-three centers, accommodating 660 children. Prior to the admission of a defective child the state of the eyes and the body of the child is ascertained and recorded. During the period of attendance at school the eyes are examined periodically, so that there is ample opportunity for the revision or confirmation of the diagnosis. The total number of blind and partially sighted children brought into this inquiry is 3,300. The conditions responsible for their state may be placed in four groups:

I. Injury or destruction of the cornea consequent on surface inflammations.

II. Inflammation within the eyeball or optic nerve.

III. Congenital defects of the eyes.

IV. Myopia.

GROUP I, *Surface inflammations*, contains 699 children, and the causes of blindness are as follows:

	Partially Blind		Sighted	Total
(a) Ophthalmia neonatorum	299	68		367
(b) Purulent conjunctivitis of later years.....	69	21		90
(c) Phlyctenular keratitis...	66	176		242
			—	699

(a) Ophthalmia neonatorum is responsible for by far the greater number of cases of blindness, and in particular for cases of total blindness.

(b) The cases of purulent conjunctivitis occurring in later months or years of child life were due to a great variety of causes, as follows:

Date of origin known, but actual cause not ascertainable	30
Eczema and streptococcal infections.....	7
Scarlet fever	8
Measles	18
German measles	1
Meningitis	6
Diphtheria	3
Erysipelas	1
Pneumonia	2
Gonorrhœa	2
Small pox	4
Chicken pox	1
Whooping cough	2
Trachoma	4

The two cases of gonorrhœal conjunctivitis demonstrate the danger to other members of the community of babies suffering from ophthalmia neonatorum. One is a girl whose motherliness was exercised towards an affected baby; she caught the disease, the cornea ulcerated, and she is blind for life; the baby died. The other is a member of a family of three girls; the youngest, a baby, had the disease, the whole family contracted it, besides suffering from vaginitis; the eyes of one of the children were damaged sufficiently to necessitate her being educated in a blind school.

(c) Amongst the cases of phlyctenular keratitis were 60 showing active nose, ear, or throat trouble, and 8 with tuberculous lesions.

GROUP II, *Inflammation Within the Eyeball*. This group contains a great variety of cases—inflammations of the cornea, of the iris, of the choroid, and of the optic nerve, but it is convenient to place them in two categories, according as the inflammation affected (a) the anterior half of the eye, or (b) the posterior half of the eye. The distinction is arbitrary but convenient.

(a) Those affecting the front half of the eye total 413 cases, of which 284 were blind and 129 partially sighted. By far the greater number are due to interstitial keratitis of congenital syphilitic origin; there are a few only of iritis or irido-cyclitis.

Interstitial keratitis—

Due to congenital syphilis.....	362
Evidence of syphilis not certain.....	24
Due to tubercle, etc.....	13
Iritis or iridocyclitis—	
Due to congenital syphilis.....	7
Evidence of syphilis not certain.....	5
Due to cerebro-spinal fever.....	2
	413

(b) Of those inflammations affecting the posterior half of the eye by far the greater number were due to a form of choroiditis known as "disseminated." This condition cannot be said to be diagnostic of syphilis, for other conditions are capable of causing the same or very similar conditions, but all the evidence goes to prove that these cases in children are overwhelmingly syphilitic in origin. With the choroiditis there is always more or less atrophy of the retina,

and of the optic nerve, so that vision is gravely impaired. Closely associated with these cases are many cases of total optic atrophy.

This group includes 349 cases, of which 294 were blind and 55 partially sighted. Of these, 210 were definitely the subjects of congenital syphilis.

1. Disseminated choroiditis with or without optic atrophy:	
Of syphilitic origin.....	210
Syphilis not certain.....	19
2. Disseminated choroiditis or optic atrophy of which the cause was assigned to other effects than syphilis, or of which the cause was indeterminate:	
Optic atrophy without choroiditis, cause unknown	39
Ditto, postfebrile (scarlet fever 1, measles 1, diphtheria 1, influenza 1, unknown 12)	16
Ditto, following head injuries	4
Ditto, following meningitis	20
Ditto, following cerebro-spinal meningitis	6
Ditto, with grave mental defect.....	13
Optic atrophy, familial.....	7
Choroiditis, familial	4

(c) There is a small group of 157 cases which falls more or less into this main second group.

Injuries	43
Blind from sympathetic ophthalmitis	29
Partially sighted—one eye lost, other defective	14
Buphthalmia or congenital glaucoma	17
Blind	14
Partially sighted	3
Honeycombed teeth	5
Hutchinsonian teeth	2
Macular defects	37
Blind	32
Partially sighted	5
Congenital colobomata	11
Deficiency	13
Day blind	12
Some evidence of syphilis.....	5
Congenital nystagmus (not including those with myopia)	58
Blind	17
Partially sighted	41
Double detachment of retina, cause unknown	2
Retinitis pigmentosa	39
Blind	34
Partially sighted	5
Sporadic cases	23
Familial cases	14
Sole child cases	2
Evidence of syphilis.....	3
Deaf mute	1

GROUP III, *Congenital Defects*, contains 408 cases of great variety and interest. For the most part it is not possible to discover to what primary

causes these congenital defects are due. Some few are hereditary—that is to say, the same defect is found repeated in the same family for two or more generations. This is particularly true of certain forms of cataract. Numerous pedigrees of this order have been published. The majority of these defects are, however, sporadic; they may appear in families whose other members are quite normal. In some instances there is a definite history of illness on the part of the parents, particularly of the mother before or during pregnancy; in some there is evidence of a syphilitic infection. Some few parents who are abnormal from one form of physical defect have produced children who suffer from another form of physical defect—for example, a father and mother both deaf and dumb but with good eyes have a family of five, of whom two are partially sighted by reason of congenital dislocation of the lenses.

(a) Albinism (blind 36; partially sighted 33)	69
Familial cases (syphilis 1).....	22
Sporadic cases (syphilis 2).....	47
(b) Defects of the crystalline lenses (blind 170; partially sighted 78) ...	248
Microphthalmia and cataract (syphilis 2)	18
Ditto, hereditary	9
Microcephaly and cataract (syphilis 2)	10
Posterior polar cataract (syphilis 4)	22
Congenital cataract, varied types (syphilis 13)	101
Lamellar cataract, postnatal syphilis 3)	57
Dislocated lenses, congenital (syphilis 1)	31
(c) Varied defects of the globes and the accessory organs of vision (blind 66; partially sighted 25)....	91
Aniridia	10
Coloboma of iris and, or choroid	27
Microphthalmia	25
Congenital anophthalmia	3
Glioma retinae	3
Defective muscles	2
Defective muscles and face	3
Extreme hypermetropia	4
Oxycephaly	11
Conical cornea	2
Hereditary corneal opacities.....	1

(No evidence of syphilis in this subgroup.)

GROUP IV, *Myopia*. The degree of myopia cited is the mean of the four meridians of the two eyes—for ex-

ample, —10 D. sphere with —3 D. cylinder in one eye, with —8 D. sphere and —6 D. cylinder in the other, give a mean of 11 D.; this is the only convenient way of summarizing such cases, altho the method has the disadvantage of not showing the additional defect of vision caused by a high degree of astigmatism.

CASES OF HIGH MYOPIA

Complicated cases producing blindness more or less severe.....	34
Myopia with nystagmus, vision very bad	20
Myopia 5 to 10 diopters.....	509
Myopia 10 to 15 diopters.....	592
Myopia 15 diopters and over.....	80
Total	1,235

No evidence of syphilis in the group; there are a number of cases of myopia with interstitial keratitis and disseminated choroiditis of syphilitic origin; these are counted with the latter diseases.

Summary of School Cases.

The provision of myope classes, and the knowledge of their provision by the extended school medical service and by the hospital surgeons, has led to the report of many cases of defect which in earlier years would never have come under review. The new conditions prevent the comparison of this return

with my previous statistics¹ in the gross: some adjustment is needed to bring them into reasonable relation. I propose, therefore, to adjust these latest returns so as to put them into as nearly the same position as those of former years, and in doing this to take into particular account the future prospects of the children.

In the table that follows the words in brackets (all) or (bad) which succeed the name of the condition or disease producing blindness indicate whether the total number of those so affected are included in the count or only the worst cases, such as myopes who could not be dealt with in myope classes because of the gravity of their defect.

1913 and 1920.—The difference between the returns of these two periods is clear when the percentages of the four main classes are set out.

Disease	1913	1920	Rise
Congenital defects	25.06	27.13	2.07
Ophthalmia neonatorum	24.17	19.79	-4.38
Syphilitic inflammation..	29.70	31.43	1.73
Miscellaneous	20.47	21.65	1.18

It would appear that the fall in the percentage of cases of ophthalmia neonatorum is a real fall, and that the apparent small increases of the three other groups are merely proportionate increases due to the fall in the second factor.

Tabular Statement of Causes of School Blindness, with Comparison between 1913 and 1920.

Disease	No.	Percent-age 1920	Percent-age 1913	Gonor- rhea	Syphilis	not certain
Ophthalmia neonatorum (all).....	367	19.79	24.17	367	...	...
Purulent conjunctivitis of later years (all).....	90	4.85	4.27	2	...	...
Phlyctenular keratitis (bad).....	66	3.56	3.45	...	...	...
Interstitial keratitis (all).....	399	21.51	19.18	...	359	24
Irido-cyclitis (all)	14	0.76	0.54	...	7	5
Optic atrophy with or without disseminated choroiditis (all)	349	18.81	20.18	...	212	19
Buphthalmia (all)	17	0.92	1.54	...	5	2
Sympathetic (all)	29	1.56	1.45	...	...	...
Macular defects (all) with congenital nystagmus (bad)	55	2.91	2.09	...	5	...
Retinitis pigmentosa (all)	39	2.10	1.81	...	3	...
Detached retina of both eyes, cause unknown.....	2	0.10	...	...	...	...
Albinism (bad)	36	1.94	2.27	...	2	...
Lens defects (all)	248	13.37	12.90	...	25	...
Other congenital defects (all)	91	4.90	4.81	...	...	...
Myopia (bad)	54	2.91	1.18	...	...	...
Totals	1,855	100.00	...	369	618	50
Percentages .....	...	...	...	19.89	33.31	2.69

BLINDNESS IN 925 PERSONS OF ALL AGES AS ASCERTAINED IN PRIVATE PRACTICE.

The desirability of securing data of blind persons of all ages led me to investigate a series of my own private cases. Some 5,000 were examined seriatim. The patients were of all classes—well-to-do, middle class, and some artisan, with an inclusion of a certain number of persons, mainly of the working classes, referred for examination and report by the National Institute for the Blind. This inclusion perhaps swells the number of the blind beyond the usual for private practice. The patients were of all ages, and, as may be expected, adults were in the majority; 925, or about one-fifth of all these patients, were blind or partly blind in one or both eyes; 603, or about one-eighth, were blind or partly blind in both eyes.

The degree of defect of the sight is noted in five columns, as follows: 1, One eye defective. 2, One eye blind. 3, Both eyes defective. 4, One blind, one defective. 5, Both blind.

In taking the totals and percentage only those in the last three categories are included. Categories 1 and 2 are given for purposes of comparison, but are not included in the count.

Some notes may be added on the several categories of disease or injury causing blindness.

Accidents.—It is noteworthy that casual accidents, occurring in civilians in their ordinary life and unconnected with their occupation, accounted for just twice as many cases of damaged sight as did industrial accidents (casual 54, industrial 27). For the most part the casual accidents destroyed one eye only, the other remaining healthy, so that most of the patients were able to carry on with their usual occupation. The severe cases followed by blindness numbered 10, nearly the same as the industrial 9. There were 3 cases of sympathetic ophthalmitis after casual accidents and the same number after industrial. War cases were few in number, probably owing to the special arrangements made for blinded soldiers. Injuries at birth head list of in-

dividual cases of casual blindness and number 7. In children, missiles, whether thrown by hand or discharged from some form of toy gun or catapult, were most prolific cause of loss. In later years amateur wood chopping accounted for more cases than any other single cause. The variety of other causes responsible for loss was very wide. There were two cases of lost eyes from injury by broken spectacles; one boy ran into a gatepost in a fog, and one woman stooped in a dark room and struck against a chair back; in each case a spectacle lens was broken and driven into the eye. Considering the large number of persons of all ages who habitually wear glasses, these accidents are remarkably few, and they are probably more than counterbalanced by the cases where spectacles have saved eyes from direct injury. The causes of industrial accidents were also very varied:

Decarbonizing motor cylinder, 1; waiter injured by sodawater bottle cap, 1; engine gauge burst, 1; blow lamp burst, 1; driving belt break, 1; stonemasons, 2; caustic splashes, 2; acid splashes in process block making, 3; laboratory worker, acid splash, 1; borax scale in brazing, 1; rivet, 1; tin strip, 1; grindstone burst, 1; steel splinters in lathe workers, 4; explosion in cartridge factory, 1; coal miner, 1; thorns in gardening, 3; septic tooth (dentist extracting tooth), 1.

Of these 27 cases, at least 10 belong to the preventable order—that is, the stonemasons, process workers, steel workers, and cartridge maker; the last named accident was caused by a direct breach of the factory rules.

Conjunctivitis.—Only one case of direct infection of the eyes by gonorrhreal discharge in an adult was found; the rarity of this severe affection compared with the frequency of urethral gonorrhea is remarkable. The trachoma cases were mostly old cases where the disease was arrested but the sight badly damaged.

Corneal Diseases.—Of all forms of diseases of the cornea responsible for blindness, interstitial keratitis, with or

Disease	1	2	3	4	5	Total Cases 34	Per Cent 5.64
Congenital defects .....	..	1	..	..	..
Dermoid of cornea.....	..	1	..	..	..
Coloboma of uvea.....	..	..	..	1	..		
Albinism .....	..	..	..	..	1		
Nystagmus, macular defects.....	..	..	3	2	2		
Microphthalmia .....	..	..	..	..	2		
Dislocated lenses .....	..	..	1	1	3		
Lenticonus .....	..	..	1	..	..
Cataract, various	1	4	4	4	6		
Cataract, lamellar .....	..	..	4	1	..		
Accidents	5	39	..	4	6	20	3.32
Casual in civil life (birth 7).....	..	6	..	..	1		
War .....	..	15	2	4	3		
Industrial	3	..	..	..	..
Purulent conjunctivitis .....	..	3	1	3	10	34	5.64
Ophthalmia neonatorum .....	..	6	2	..	9		
Later years (gonorrheal) .....	..	..	..	..	..
Trachoma .....	..	..	..	..	..
Essential shrinking .....	..	..	..	..	1		
Corneal diseases	4	..	6	1	2	51	8.46
Conical cornea	2	6	6	2	1		
Superficial keratitis .....	..	2	..	2	..		
Hypopyon keratitis .....	..	4	3	11	10		
Interstitial, syphilitic	1	..	..	2	1		
Interstitial, tubercle .....	..	..	..	1	..		
Interstitial, leprosy .....	..	..	..	..	3		
Sclerosing keratitis .....	..	..	..	..	..
Cataract, senile	4	6	44	28	17		
Cataract, diabetic .....	..	..	1	1	3	94	15.09
Iritis and irido-cyclitis	1	5	1	3	11	56	9.29
Syphilitic .....	..	22	11	17	13		
Various (with tubercle 6, gonorrhea, 5, cerebrospinal 2) .....	..	..	..	..	..
Vascular diseases	1	..	..	..	..	49	8.12
Vitreous hemorrhages .....	..	6	..	1	1		
Embolism, thrombosis	2	4	3	5	11		
Retinitis, renal .....	..	..	3	3	7		
Retinitis, diabetic .....	..	..	..	..	..
Retinitis pigmentosa .....	..	..	5	2	..		
Detached retina (10 with myopia less than 10 D.) .....	..	11	..	6	8	14	2.32
Choroiditis .....	..	..	..	..	..	77	12.77
At macula	1	13	3	3	6		
Central senile	2	4	17	9	13		
Disseminated, syphilitic	2	2	1	2	12		
Disseminated, other causes .....	..	1	2	1	8		
Optic atrophy .....	..	..	..	..	..	38	6.3
Various causes (syphilis 6) .....	..	7	5	2	11		
Leber's .....	..	..	..	..	2		
Tabes .....	..	..	1	2	8		
Pituitary disease .....	..	3	2	..	..
Hemianopia .....	..	..	4	..	1		
Glaucoma .....	..	..	..	..	..	55	9.12
Buphtalmia .....	..	..	..	4	2		
Chronic glaucoma	3	3	13	12	12		
Acute glaucoma	1	5	2	4	6		
Malignant .....	..	2	..	..	2	2	0.35
Myopia over 10 D. (detachment of retina in 11 cases)	6	1	35	30	19	84	13.93
Squint, one eye amblyopic .....	..	55	..	..	..
Tobacco amblyopia (not counted in total) .....	..	..	7	..	..
Total .....	..	..	..	..	..	603	100.00

without iritis, and due to congenital syphilis, heads the list, accounting for 28 cases in 72.

Senile Cataract.—Senile cataract accounted for more blindness in this collection than any other disease. No doubt many of the cases would be susceptible of amelioration if and when operation could be performed, but at the time they were industrially blind. The seventeen blind in both eyes include several who had been operated upon successfully by myself or other surgeons, but who were found after operation to suffer from central senile choroiditis; operation secured for them some freedom of movement, but owing to degeneration of the retina they could not see definite objects or read. These cases are very disappointing to the surgeon and to the patient, and perhaps do more to discredit operation in the popular mind than the less frequent cases of operative failure or postoperative inflammation. Unfortunately the condition cannot be foreseen.

Iritis and Iridocyclitis.—Of known causes of iritis syphilis heads the list. Syphilitic iritis produced total blindness nearly as frequently as all the other causes together. Cases classed "various" include a great variety of approximate causes, such as those arising from septic states within the body, tubercle, gonorrhea, rheumatism, gout, pyorrhea, colon disease, and bladder infection in nearly equal proportions. There were several in which no case could be assigned with any certainty.

Vascular Diseases.—Blindness due to vascular diseases, such as kidney disease and diabetes, was not frequent when the incidence of these general diseases is considered.

One of the cases in this group illustrates the danger of the "one eyed" man. A man with one eye practically blind from old squint lost the other completely by embolism of the central retinal artery. (Two other cases of one eyed men in the return lost the remaining eye, one by accident, the other by disease.)

Detachment of the Retina.—In this

group are 25 cases, of which 14 were blind.

The causes of the detachment were many. Ten occurred in subjects of myopia of less than 10 D.; other cases were due to the effects of antecedent inflammation of the eye causing vitreous changes; some to alleged but unproven injury or septic disease; and in some no cause could be found. Besides these there were 11 other cases of detachment in the myope group and one double detachment due to accident. So that there were in all 37 cases of detachment.

Choroiditis.—The frequency of senile decay of the retina and choroid at the macula was remarkable. There were 45 of these cases in a total of 109. The condition is irremediable, and probably unpreventable, but the subjects of it are not so hopeless as those blind from other causes, for they can move about by sight with comparative freedom, even tho the sight of definite objects and of reading is lost to them. I had one patient, a parson, who did his full duty; his parishioners did not know of his blindness, a good memory enabled him to "read" lessons and prayers, whilst his keen observation enabled him to recognize his parishioners by gait or tricks of manner.

Optic Atrophy.—Syphilis headed the list of primary causes of optic atrophy, being responsible for nearly one-half of the cases, including 6 cases of simple atrophy and 11 of tabes dorsalis.

Glaucoma.—It is noteworthy how much more common was the chronic form of glaucoma than the acute, and how much more dangerous were its effects. Even after successful operation gradual decline of vision was common.

Malignant Disease.—Malignant disease was a rare cause of blindness. Of the two totally blind, one was a child with double glioma of the retina, the other a man with sarcoma in one eye; his other eye had been lost earlier by embolism of the retinal artery.

Myopia.—In this group only those with myopia of 10 diopters or more were included. They numbered 99. Of these,

8 had good vision, 6 defect of one eye, and one blind of one eye; 84 had more or less bad vision, and were blind for industrial purposes. High myopia, therefore, comes second on the list as a cause of blindness, after senile cataract, and unlike the latter its effects are irremediable. The causes of the failure of vision were mainly three: vitreous degeneration and opacities, detachment of the retina, and choroidal degeneration. Of the three, the last was the most frequent. The changes seen were patches of

treated early. There is still a belief abroad that children "grow out of squint," but they do so with the loss of an eye. They become ineligible for the services, for many forms of industrial employment, and there is an added risk from accident.

Tobacco Amblyopia.—The number of cases of chronic poisoning and loss of vision from the excessive use of tobacco was small. The disease is remediable; those seen were referred by doctors, and since they were not seen a second

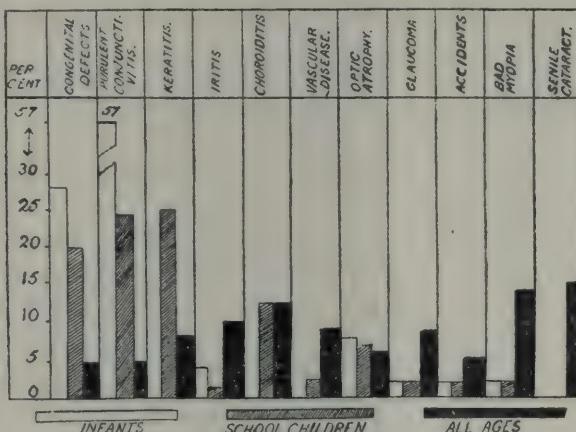


Chart showing frequency of different classes of the conditions, as causing blindness.

gross degeneration, or much more frequently finer degenerative changes more nearly like a coarse form of central senile choroiditis. Not infrequently the final loss of central vision was due to a hemorrhage into the threadbare tissue of the macula. These figures of the high incidence of blindness amongst high myopes form a strong plea for the increase of preventive educational methods, such as the myope class amongst children, so that they may learn to use their eyes with discretion; and also for care in the selection of suitable work for them when they leave school; too many of these persons with high degrees of myopia and blindness had been occupied in clerking.

Squint.—The risk of the "one eyed" has been commented upon. The loss of central vision from squint can be prevented in many cases if they are

time it is assumed that they were cured by treatment.

The Incidence of Venereal Disease.—Cases of ophthalmia neonatorum numbered 17; assuming these severe cases to have been gonorrhreal, they make with the one case of gonorrhreal conjunctivitis in an adult 18, or 1.95 per cent. of the gross total of 925; including the 5 cases of gonorrhreal iritis the total percentage equals 2.48.

Cases of disease due to syphilis—keratitis, irido-cyclitis, choroiditis, optic atrophy, and tabes—numbered 85, or 9.19 per cent. of the gross total. These syphilitic cases form the largest group of preventable disease in this all-age selection of blind persons.

CAUSES AND PREVENTION

1. The difference in the incidence of the various causes of blindness in these three sets of cases under examination

is clearly shown in the chart. (a) In infancy the causes of blindness are few, so the percentage of these causes is high. Congenital defects and purulent conjunctivitis account for nearly all, other causes are few and the number of cases insignificant. (b) Amongst school children other conditions come into account. First, the death rate of infancy will have reduced the number of cases of blindness in infants. Secondly, other causes of blindness will show their effects, particularly those arising from constitutional disorders. So that the startling high percentage due to ophthalmia neonatorum is reduced, and takes second place to the larger number of blind cases due to congenital syphilis. (c) In the third group of persons of all ages, infants, children and adults, there are again two facts that modify the conditions found for infants alone, or children alone. The age proportion of the population comes into full play, the greater number of adults reduces the infant population to its correct position, and correspondingly the incidence of the several causes of blindness. But other causes of blindness which affect mainly or only adults—accidents, vascular disease, glaucoma, gross myopia and senile cataract—swell the total blindness and correspondingly diminish the proportion of blindness of infancy or childhood.

I suggest that the return of the third set of evidence presented, from all ages, gives a fair picture of the causes of blindness occurring in the population of this country generally. Minor differences may appear in different areas due to special industrial conditions, but these will hardly be likely to affect the main proportions.

2. Examination of popular literature indicates that wholly erroneous beliefs are held as to the causes of blindness owing to the laxity with which statistics are quoted. Looking at these returns one would be justified in stating that 50 per cent. of the blindness of *infancy* is due to the preventable disease ophthalmia neonatorum, but wholly wrong in stating that 50 per cent. of blindness was due to this cause. Again, it would be correct to state that 50 per

cent. of the blindness in *school children* is due to parental venereal disease, but not that 50 per cent. of blindness is due to venereal disease; yet I have seen this statement in print, based on an incorrect quotation of my 1913 returns. The true figures for "all ages" are seen to be blindness from gonorrhreal disease 2.5 per cent., from syphilis, 9 per cent.

3. Prevention. If we examine the table of the causes of blindness we shall see that there are certain causes over which we can have little influence, and others which are well within our power of prevention, possibly of extinction.

(a) *Congenital Defects*.—Too little is known of the primary causes of sporadic cases to permit of useful suggestion. A small number are hereditary; where the defect is serious marriage and parenthood is undesirable.

(b) *Ophthalmia Neonatorum*.—Prevention of the disease can be secured by the treatment of the vaginal disease of the expectant mother; this is the one and only certain means of prevention. And it is within our power to accomplish this desirable end. Measures to check the effect of the infection in infants have reached a high measure of success. Prophylaxis and notification have done much to this end. Short of a stiffening up of the procedure in certain districts of the country these measures have accomplished all that they can. What is now needed is the establishment of such medical arrangements that diagnosis and treatment can be made as swiftly as the fire brigade can be brought in when there is an outbreak of fire in our homes. I would like to see established in the center of every convenient area an ophthalmia neonatorum unit. There should be a small hospital to which affected mothers and infants could be transferred for treatment. To this there should be attached a mobile diagnostic unit. A motor car fitted with a small laboratory equipment with an expert ophthalmic surgeon and nurse; the unit should be available for immediate attendance at any home where a suspected case occurs. Midwife or doctor in attendance should notify the initial

symptoms of any case, so that the mobile unit could proceed to its investigation without delay. If the surgeon should find the diagnosis proven it should be within his power to remove the mother and infant to the hospital for treatment forthwith. The benefits of prompt removal of affected cases have been demonstrated in Liverpool. A similar hospital has been established in London, but its benefits have been almost nullified owing to the lateness of the transfer of cases. I believe doctors would welcome the possibilities of prompt assistance in diagnosis, for cases are not numerous, and accurate diagnosis is only possible where there is constant handling of these cases. The costs would be little compared with the benefits in the reduction of blindness.

(c) *Purulent Conjunctivitis in Later Years.*—The number of cases is so small and the variety of primary causes so large it would appear that we have here something like an irreducible minimum. It is remarkable that trachoma is almost negligible as a cause of blindness in this country.

(d) *Phlyctenular Keratitis.*—The number of bad cases arising therefrom is small, but the number of damaged eyes is large. These cases are most certainly preventable. They are primary, due to social conditions—poverty, poor food, dirt. They are scarcely known amongst well-cared-for children. Treatment of relapsing cases cannot be effectively carried out unless there is a long period of efficient treatment in a high and dry country district. Recently arrangements have been made in London for the removal of cases occurring in school children to the Swanley Ophthalmia Schools in Kent, and we may expect good results from these measures.

(e) *Syphilis* is one of the great causes of blindness. It is certainly preventable. It rests with the success of the centers for the treatment of venereal diseases. If parents were effectively treated before procreation, cases of blind children from this cause would be extinct. There is no reason why we should not attain this success.

(f) *Industrial Accidents.*—Blindness from this cause is likely to show variation in different parts of the country. It will be high in industrial areas. Prevention is to be obtained by the better safeguarding of machinery and the use of goggles in all work where flying fragments are common. There is at present a prejudice amongst workers against goggles. A large part of this is, I believe, due to the atrociously bad fit of the common run of these protectors. Difficulties from sweat and steam there will be always, but if to these be added a fit so uncomfortable that the face is hurt and vision obscured it is no wonder that goggles are objected to. Well fitting goggles suited to the particular industry, and the extension of the propaganda of the "Safety First" Association, will go far to popularize their use and reduce accidents. Introduction of a bonus scheme into workshops whereby workers gained by the reduction of accidents would go far to stimulate healthy views on the desirability of workers protecting themselves. In some work, such as in coal mines, where accidents are common and sepsis therefrom dangerous, protectors are impossible of use; in such cases first aid stations, where foreign bodies can be promptly removed and risks of infection averted by irrigation, are needed urgently.

(g) *Myopia.*—This is no place to discuss rival theories of the causes of myopia. Purely by way of convenience we are accustomed to speak of two divisions—a "school" or "acquired" myopia, and a "congenital" or "pernicious" myopia. School myopia is of low degree and does not figure in this return. This low degree myopia is probably due to many causes acting, singly, consecutively, or conjointly in this or that case. A hereditary softness of the coat of the eye, softness of the body due to illness, difficulty in seeing owing to astigmatism, habitual close work under bad conditions of light, position, and health, are each and all undoubtedly causes severally or jointly in the production of myopia of low degree. Of all of these the last, the conditions of

work (duration of close work, lighting at work, position at work, and the state of health whilst at work, for child and adult) is the one factor that is in our power to influence. For that reason it is wise to concentrate on the possible. But the cases of myopia in the return of this paper are not these. The children of the myope classes are high myopes, and some are found at such an early age that environment cannot be responsible for their onset. The figures show that the maximum incidence ranges between 10 and 15 diopters of myopia—a very high figure. It is obvious to the least observant that even when provided with suitable glasses these children see with difficulty both distant and near objects. Further, there is evidence that these stretched eyeballs are frail, and that there is an ever present risk of damage or degeneration of the retina, and that this risk is increased by strain. The myope classes are established to meet these two difficulties. To provide these handicapped children with a scheme of education which can be undertaken with least strain to the eyes, and to teach them such methods of work as

may, by becoming habitual, even after school years, help to prevent the dangers that threaten. This influence is made conspicuous when the child leaves school by assisting arrangements for obtaining suitable work, a matter of especial moment when we note how high a proportion of adults with high myopia and retinal degeneration have been employed as clerks. The scheme of the myope class is very simple. It is a reversion to the times when the teacher was supreme in the class and not books and paper.² There are thirty-three of these classes in London; classes have been established in Bolton, Birmingham, Bradford, Leicester, Leeds, Liverpool, Stoke-on-Trent, Nottingham, Exeter, Brighton, Bristol, Sheffield, Walthamstow, in some towns of Scotland, in several of the United States of America, and a special committee has reported in favour of establishing them in Canada. There is room for the establishment of more of these classes particularly in urban areas; it would be a genuine measure for the prevention of blindness.

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NEIGHBORHOOD SIGNS IN PITUITARY TUMOR

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The symptoms of pituitary tumor due to the proximity or extension of the tumor are largely ocular. They are here summarized in a way serviceable to the ophthalmologist, who may be first consulted for such disease. Read at the meeting of the Sioux Valley Eye and Ear Academy, July 12, 1921.

This subject should be of special interest to ophthalmologists and rhinologists, as the greater number of early diagnostic signs of pituitary tumor relate to the eye and the nose. The term, neighborhood sign, is used to indicate a disturbance of function of neighboring structures by enlargement of the pituitary gland from tumor growth.

The pituitary gland is situated in a small fossa of the sphenoid bone, the sella turcica or pituitary fossa, bounded inferiorly by the sphenoid cells, anteriorly, and partly above by the anterior and the posterior clinoid processes of the sphenoid bone, laterally by the cavernous sinus, and above by the dorsum sellae and the diaphragma sellae, a membrane of dura which is perforated by the stalk of the infundibulum. Above this dural membrane is the optic chiasm and the floor of the third ventricle of the brain. This close relation to the sphenoid cells below and the optic chiasm above, leads to the neighborhood signs related to these structures and to the question of operative approach to pituitary lesions.

The pituitary gland is surrounded, in addition to its bony encasement, by a dural envelop which bridges over the lateral and superior bony deficiencies. Tumor growth of the gland would first produce symptoms of tension within the dural capsule. The tension of the dura causes headache, localized fairly accurately in the sphenoid region and radiating to the temples. This headache is subject to variation, probably due to differences in vascular distention of the enlarging gland, but often is severe and persistent. The differentiation from sphenoid cell infection is not easy in the early stages before bony or other neighborhood symptoms appear.

The next neighborhood symptom in many cases is enlargement of the bony

fossa of the pituitary gland, revealed by X-ray. The necessity for stereoscopic X-ray plates should be emphasized, with the view slightly down into the fossa, thus enabling one to estimate an increase of depth where the lateral borders might be normal in appearance and hence misleading. The average normal measurements of the sella are 10 to 12 millimeters anteroposteriorly, 8 millimeters in depth and 14 to 15 millimeters transversely. Profile radiographic measurements exceeding 15 millimeters anteroposteriorly and 10 millimeters in depth may be looked upon as indicating an enlargement, not necessarily pathologic. However, the extreme of normal variation may reach 30 millimeters anteroposteriorly.¹

The pathologic changes in the pituitary gland which produce enlargement are chiefly adenomatous and cystic, not truly malignant, and are commonly associated with the familiar syndrome of hypopituitarism from deficiency of pituitary secretion. Giantism and acromegaly usually are uncomplicated by tumor formation. Heuer² recently reported on the pathology of twenty true pituitary lesions in which operation was performed, and solid adenomata found in 80%, and cystic adenomata in 20%. There was greater variety in the suprasellar tumors; gliomas, solid and cystic epithelial tumors, and sarcoma; none of these, in a strict sense, having origin from the pituitary gland. The bony changes due to true pituitary tumor vary from a simple spherical distension to an extreme ballooning out of the fossa, which projects far into the sphenoidal cells and destroys more or less completely the dorsum sellae.

The direction of early extension of pituitary tumors is of great importance from the viewpoint of surgical therapy. This has been discussed recently by

Heuer² of Johns Hopkins and by Adson³ of the Mayo Clinic. Heuer, from his personal experience in viewing pituitary tumors thru an intracranial approach, believes; first, that before the floor of the sella turcica has been eroded and even before the posterior clinoid processes have become destroyed, the pituitary tumor has broken thru the diaphragm of the sella turcica and become an intracranial growth; and second, that even tho the floor of the sella turcica is removed by early operation conducted thru the nose, the tumor will not, or only to a slight extent, grow downward, but will in spite of these measures grow upward into the intracranial chamber. Examination of the reports in the literature of cases, in which the patients died after transsphenoidal operation, showed that in practically 100% of the cases, even tho the floor of the sella turcica had been eroded and the tumor filled the sphenoidal cavity, a far larger portion of the tumor had extended into the intracranial chamber. Adson in a report of six cases, approached intracranially, found a similar early intracranial extension.

This fairly well establishes early intracranial extension of pituitary tumors and leads to the visual neighborhood symptoms which are dependent upon pressure of the tumor on the under surface of the optic chiasm. The direction of growth after pituitary tumors have broken thru the diaphragm sellae may be in any one of five positions; first directly upwards against the chiasm; second, forward in front of the optic chiasm between the optic nerves; third, backward behind the chiasm; towards the third ventricle of the brain; and finally the tumor may grow laterally on either side of the chiasm and involve the cavernous sinus. Cope⁴, on anatomic grounds and from a study of the literature, concludes that the early intracranial extension of pituitary tumors is forward in front of the chiasm. Heuer, in 22 intracranial exposures of pituitary tumor, found the extension forward between the optic nerves in 20

instances. Adson's six cases, exposed intracranially, all appeared forward.

The visual symptoms produced by this rather constant forward intracranial extension of pituitary tumors are perhaps the most important of all neighborhood signs. In the first place, their presence establishes the fact of intracranial extension sufficient to cause destructive pressure on the optic nerves. The result of this is a simple optic atrophy without the presence of choked disc. The second point of importance is the necessity of operative relief before this optic atrophy has progressed to an irreparable stage.

An analysis of the position of the several fasciculi in the chiasm and optic nerves, based upon Henschen's⁵ and Cushing's⁶ works, explains readily the fact of the more frequent association of bitemporal hemianopsia with pituitary tumors. Pituitary tumor in its typical anterior extension would first press on the under surface of the chiasm and interfere with the ventral, crossed fasciculus which supplies the lower nasal retina, thus producing a visual field defect in both upper temporal quadrants. Further anterior extension of the tumor between the optic nerves would result in medial pressure on both ventral and dorsal, crossed fasciculi and a more complete temporal hemianopsia. Cushing has divided the progressive visual field defect of pituitary tumors into eight stages from upper temporal quadrant defect to complete blindness. It is noteworthy that the color fields show an earlier defect than the form fields, a point which is of early diagnostic significance.

In a large series of pituitary tumors there always are found numerous variations from the typical bitemporal hemianopsia, due to the variability of the direction of growth and the late stage commonly encountered at first examination. These atypical visual field defects more often are due to suprasellar tumors, not of the pituitary gland proper. Thus, in Heuer's series of 25 exposed tumors producing a chiasmal lesion, 73% were pituitary tumors, 24.3% were suprasellar tumors,

and 2.7% optic nerve tumors, which probably represents a truer average than previous records.

There are many other neighborhood symptoms that occur in advanced cases of pituitary tumor with extensive intracranial infiltration. Involvement of the oculomotor nerves may cause paralyses; involvement of the cavernous sinus is thought to account for a moderate exophthalmos in some cases. The

olfactory tracts may be destroyed and anosmia result. Pressure on the uncinate region of the temporal lobe of the brain may cause epileptiform seizures with a gustatory or olfactory aura. Nasopharyngeal signs are common, troublesome epistaxis; intermittent discharge of mucus, and hypertrophy of lymphoid tissue. These often have led to ineffective nasal surgery without recognition of the underlying cause.

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TRANSPLANTATION OF OCULAR MUSCLES

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This report of personal experiences covers cases of abducens paralysis, paralysis of the superior rectus and ptosis treated by transplantation operations, using the technic worked out by the writer. This technic and the results obtained are explained by illustrations. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July, 1921.

The surgeon and internist should be interested in this subject because paralysis of ocular muscles is usually a symptom of some disease or head injury, and is first seen by one or the other. It should interest the otologist because abducens palsy occasionally occurs in disease about the apex of the petrous portion of the temporal bone (Gradenigo Syndrome). They should be informed that relief is possible in spite of the statements to the contrary in most textbooks of ophthalmology. Cases of paralysis of ocular muscles should not be dismissed as incurable and told to wear a patch, but should be referred to the ophthalmologist early, in order that the progress may be watched and operation done as soon as it is certain that power is not returning in the affected muscle. Cases of third nerve palsy must be excluded as a complete case of this kind leaves nothing with which to work.

Operation should be done before contracture starts in the opponent of the affected muscle, because it may then be possible to avoid extensive tenotomies and so obtain a better final functional and cosmetic result. Usually a paralysis shows early improvement and a fairly rapid progress toward its final position. If it is complete at the end of three months in spite of proper treatment, the prospect of cure is too slight to warrant further delay. In cases of incomplete paralysis, operation should be delayed till it is certain that progress toward cure has stopped. In these cases better average functional and cosmetic results would be obtained by transplantation, omitting tenotomies, than by the usual shortening of the affected muscle with tenotomy of the opponent. In cases of congenital paralysis, or absence of the externus, contraction of the internus seldom occurs so that

there is no great hurry on that account. However, these cases should be operated as early as possible in order to increase the chance of saving vision.

The fact that binocular vision has been secured in a number of the reported cases seems to show that the muscle action is guided entirely by the fusion sense, irrespective of the muscle or nerve employed to secure the necessary movement. If this is true the transplantation principle can be applied in the following classes of paralyses:

1. Of the externus which, of course, is the commonest as well as the most favorable. Here the outer halves of the vertical recti are to be used.

2. Of the internus of which the commonest is that due to excessive tenotomy for convergent squint. However, isolated paralysis of the internus does occasionally occur as a partial third nerve palsy, or as a complication of ethmoidal suppuration. In this instance the inner halves of the vertical recti are used; and the operation should be more successful because the tension on transplanted sutures would not be so great. In fact, owing to the angle of the vertical recti, the distance to the internus margin should actually be less than to their own normal attachment.

3. Of the superior rectus, which is not uncommon as a congenital condition. It is occasionally traumatic, as in my case. Here the upper halves of the horizontal recti are used. Transplantation of the middle section of the levator palpebrae is possible (a Motais in reverse). One such case has recently been reported.

4. Of the inferior rectus in which the lower halves of the horizontal recti should be used. I have never seen a case of complete isolated paralysis of this muscle.

5. Of the superior oblique for which the only available method is that advocated by Jackson of moving the superior rectus outward. The only cases of this condition I have seen have been successful in escaping operation at my hands.

6. Of the levator palpebrae (also congenital absence thereof) for which the central portion of the superior rectus is used; the Motais operation.

the three muscles. This is virtually what was done in case 8 with such excellent results.

PERSONAL CASES

1. *Abducens Palsy*.—Seven cases, complete 4; incomplete 3. Results: In one incomplete case there was an entire failure to change the condition and in one complete case no outward rotation was obtained, but only a cosmetic result. In

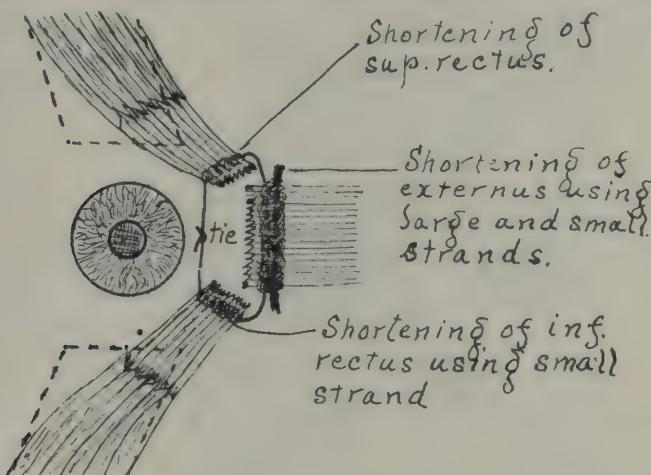


Fig. 1.—Continuous cinch shortening of three tendons with transplantation.

TECHNIC. Under case 1 is given in detail the method of operation as modified by me, and under the other cases the various changes in this as thought best in each instance. Here I wish again to emphasize the need to shave the tendon close to the sclera to save the fibrous attachment and to lessen the chance of the stitches slipping out. Still further to lessen the chance of that accident I now use my cinch shortening loop in the portion transplanted. This method was described in detail in a paper for the 1916 meeting of the Section on Ophthalmology of the A. M. A. (See Transactions, p. 241.) This is used also in the Motais operation and is my only modification of that operation as usually described. Figure 1 shows the cinch shortening method as I am going to try it in my next case. Thus modified it seems much simpler to me, and consists in using a continuous cinch shortener for

all the others satisfactory results as regards position and rotation were secured.

2. *Superior rectus palsy*.—One in which the result was excellent both as to position of globe and rotation.

3. *Ptosis*.—Six in which the Motais operation in each instance was successful in uncovering the pupil even in extreme upward rotation. Remarks on this operation and the series of six cases are grouped separately.

These results make it entirely worth while to try transplantation, as the cases are otherwise hopeless and in any event cannot be made much worse.

CASE 1. This case has been reported with explanatory illustrations in this JOURNAL. (Mar. 1919, v. 3, p. 197.)

CASE 2. O. B. Complete paralysis of the left extenus due to skull fracture. Outward rotation stops 10 degrees short of primary position; convergent squint of 30 degrees. Operation Feb. 17, 1917, by the same method as in case

1 but under a local anesthetic. An extremely unruly patient making the proper carrying out of the steps very unsatisfactory. Internus not touched. One week later esophoria 12° and maintained binocular vision in primary position; beginning outward rotation (5 degrees). Feb. 27th a central tenotomy of the internus was done, this with the idea of playing safe as the vision was normal in each eye. One

cause of weak externus of other eye, I proposed shortening it, but he promptly disappeared.

CASE 4. W. H. B. 20 years. Right eye crossed since 3rd year. Outward rotation stops well short of primary position making it a complete case. Operation July 19, 1919, the same as case 1 but with an extra large shortening of the middle section. Internus not touched. July 31st, eyes were parallel

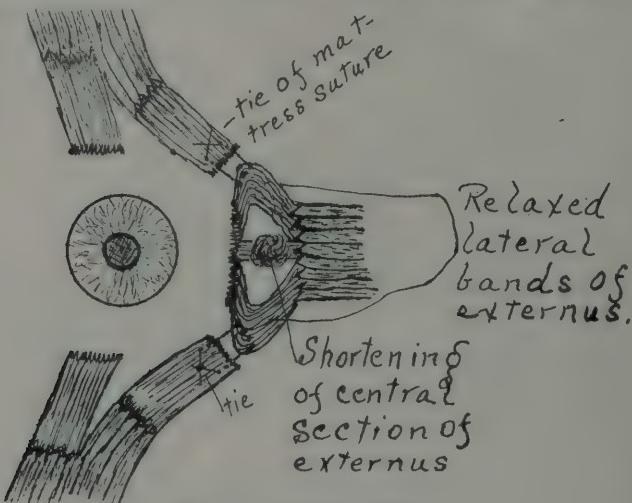


Fig. 2.—Operation in Case 5.

week later he had esophoria 2° and outward rotation of 16° with no diplopia in primary position. On this date I proposed an actual lengthening of the internus which would certainly have given a worth while increase in outward rotation. But he disappeared and I have not seen or heard from him.

CASE 3. J. H. F., 50 years. Another complete case. Thinks he was always slightly cross-eyed, but about five years ago began to grow rapidly worse. Now right eye converges 60° and is unable to turn out to the primary position. Outward rotation in the other eye also weak (about 30°). Operation Dec. 5, 1918, by the same method as case 1 except that the internus was completely cut. The immediate result was a reduction of the squint to 20 degrees and an outward rotation to 20 degrees. On Dec. 23rd, his squint measured 15 and outward rotation 30. On this date, be-

in primary position, but with only a suggestion of outward rotation. In hopes of increasing this the following operations were done. Aug. 2nd. Internus lengthened to limit. Aug. 18th. Inner halves of vertical recti cut. Aug. 29th. Complete tenotomy of internus. In spite of all these there was no gain in outward rotation. Jan. 27, 1921. Right eye converges about 10 degrees; able to turn eye only to primary position. He is fairly well satisfied with the cosmetic result. The probable cause of failure to secure rotational results was too great relaxation of transplants, by the large shortening of the externus, with a consequent return to their original position.

CASE 5. C. R. L. 35 years. Left eye converges 60 degrees; internus contracted; outward rotation only 20 degrees. This is therefore not a complete case. Internus had been cut when he

was 19. Operation June 5, 1919, by method shown in Fig. 2. The middle band was given a large shortening thus relaxing the lateral bands so that the vertical recti transplants could be sutured directly to them without tension. Internus was dissected free but steadied by a mattress suture. Aug. 5th, had an outward rotation of 40 and a remaining squint of 20 and on this date the internus was again dissected free.

CASE 7. Specific paralysis of left *externus*, of one year's duration. There was no squint, in fact inward rotation was defective indicating partial paralysis of the 3rd nerve as the vertical rotations were normal.

Operation No. 4, 1920. Method was varied as shown in Fig. 3. The entire *externus* was shortened; and the transplants merely slung together by the same stitch, so in case one stitch slip-

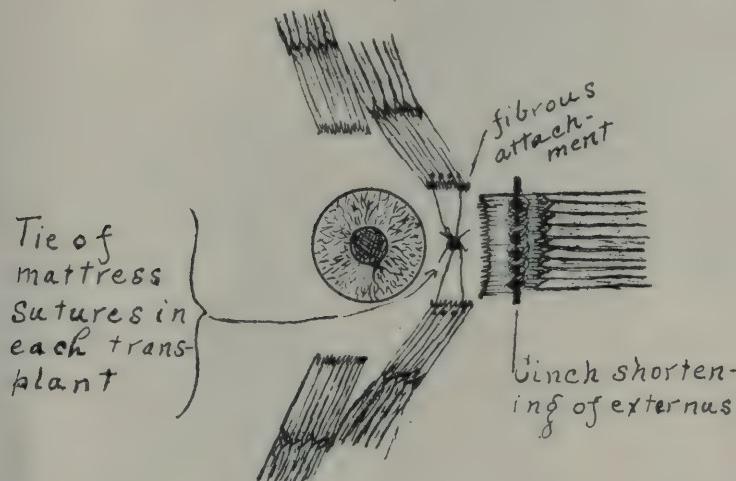


Fig. 3.—Operation in Case 7.

Sept. 17th, the pupillary membrane (remains of a traumatic cataract present since first year) was cut by a scissors operation.

Dec. 12, 1919. Now has a black pupil and a temporal visual field for hand movements but no direct fixation or vision. Eyes are perfectly parallel and outward rotation is 50 degrees. It is possible that just as good a result would have been secured by a simple shortening of the *externus* with complete tenotomy of the *internus*.

CASE 6. F. F. Specific paresis of right *externus*, outward rotation 5° with a convergent squint of 30°. Aug. 18, 1919, operation as in Case 1, the *internus* not being touched. On Sept. 3rd, his eyes were parallel and outward rotation had already increased to 20°. This man was a sailor and on this date his ship left, so I have not seen him since.

ped both transplants would go back to their normal positions. This was done because she had normal vision in each eye; binocular vision; and therefore I did not wish to risk producing a vertical deviation. The stitch must have pulled out for the result was a total failure to make any change in her condition. She was an impossible patient during the operation and has caused me to favor general anesthesia for all these operations, unless there is a positive contraindication.

CASE 8. Mrs. N. B. Complete paralysis of left *superior rectus*: almost complete of lid elevator with absolute blindness all due to gunshot wound of orbit. Motion of eye right, left and down is good. Eye itself turns far down. There is but little upward motion of lid, being slightly better on awaking. Operation May 22, 1920, consisted in transplantation of upper halves of hor-

izontal recti to margins of the superior rectus by method shown in Fig. 4, with a complete tenotomy of the inferior rectus. Immediate effect was a slight upward deviation of globe and a marked improvement in the ptosis. June 15th, she was able to rotate the eye up 20° and there was a slight upward deviation as shown by the pupillary reflection of light. The idea in this case was to obtain some upward rota-

tion I wish to emphasize that this operation gives the closest possible approach to the normal associated action of the superior rectus and lid elevator.

The technic is covered so fully in Beard's Ophthalmic Surgery (p. 247-250) that it would be a waste of time for me to repeat it. In his summary, he mentions having done the operation 16 times and states: "The results in all of them are far and away the best I

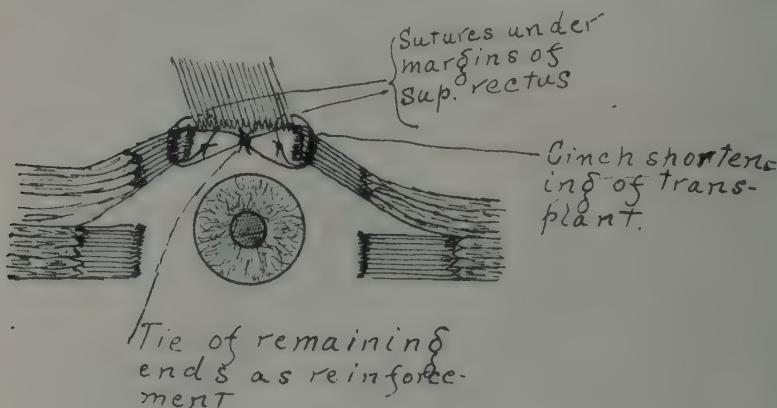


Fig. 4.—Operation in Case 8.

tion of the globe and then do a Motaïs operation. I have not seen her since June 15, 1920; but in a letter, dated April 21, 1921, she says "I would like to have you see the eye now. The lid is up quite a bit and the eyeball is way up."

The variation in method in this case consisted in shortening each transplant by my cinch loop using double triple O gut, one end from each going under respective margin of superior rectus and tied, the remaining two ends from each transplant being tied together in front of superior rectus insertion as a reinforcement.

MOTAIS OPERATION FOR PTOSIS

In my opinion this should always be the operation of choice where any power of upward rotation (no matter how small) of the globe is retained. Case 1 proves this.

There is no need before this meeting to go into detail as regards the technic of the operation. In this connec-

have ever obtained in this affection. The manner in which the free border of the lid keeps out of the way of the pupil, as the subject looks further upward is truly beautiful to contemplate." Further he says: "No matter how little there is (of upward rotation) the Motaïs operation is the one, in my opinion, that should be chosen. After the lid is once raised the superior rectus develops more and more its proper function. Herein lies the explanation of a unique and most gratifying feature of the Motaïs method, viz., the constantly increasing enhancement of the effect for weeks and even months after the operation."

These quotations leave little to be said except to report the results in my six operations.

CASE 1.—Miss M. B., age 25, presented a complete ptosis of left lid the result of falling on a button hook in her third year. There was also a downward displacement of the globe. Upward rotation only 20° as compared

with 40° in the other eye. With the idea of increasing upward rotation, preparatory to Motais, two preliminary operations were done; a shortening of the superior rectus and a lengthening of the inferior rectus. After these, vertical rotations were practiced for three months by which time the upward rotation had reached 35°. The Motais was done on May 20, 1919, without much trouble. The result was excellent the pupil being uncovered even in extreme upward rotation. The brow, which was very high, gradually



Fig. 5.—Case 2 before operation (Motais).

came down, finally nearly to the same level as the other. This case had had two operations which must have been merely skin excisions so that the lid hung from the brow like a curtain.

CASE 2.—J. J. 6 years. Congenital ptosis of left lid. Upward rotation of globe normal. There is also a convergent squint. Did Motais operation on Dec. 8, 1919 without trouble. Healing uneventful. One year later the excellent result was maintained, the pupil remaining uncovered even in far upward rotation. In the primary position the lid aperture is only one half millimeter less than that of the good eye. The convergent squint has practically disappeared. Figs. 5 and 6.



Fig. 6.—Case 2 after operation.

CASE 3.—Mrs. H. S., music teacher who desired the operation for cosmetic effect. The drooping of right lid had been gradually increasing for 15 years and now the aperture is only one-half that of the other side, even less tired locally or generally. Motais operation



Fig. 7.—Case 4. The contrast in the two eyes shows the appearance before and after operation.



Fig. 8.—Case 5. The contrast in the two eyes again shows the before and after operation appearance.

performed Feb. 2, 1920, without trouble and with uneventful healing. On June 2, 1920, the palpebral aperture was 9.5 as compared with 10 millimeters on the good side — 9 in extreme upward rotation.

CASE 4.—A. P., aged 6 years. A case of bilateral hereditary ptosis with reversed epicanthus (lower lid overlaps upper) and convergent squint. The case is similar to case 5 only the deformity was much worse. The Motaïs operation was done on Sept. 2, 1920,



Fig. 9.—Case 6 before operation.

without trouble and healing was uneventful. The usual effect was secured, namely an uncovered pupil even in upward rotation, while before operation she had to throw the head far back in order to see under the lid margin. Fig. 7.

CASE 5.—F. R. aged 4, similar to 4 only not so bad and not hereditary. This case had had an operation on each lid by another ophthalmologist and also one on the nasal bridge for the epicanthal deformity. All were failures



Fig. 10.—Case 6 after Motaïs operation and shortening of internus.

according to the mother's statement. I think no attempt should be made to correct the epicanthus till maturity as the growth of the nasal bridge lessens it. This deformity in the father of case 4 was hardly noticeable.

Upward rotation of globes normal. Motaïs operation Nov. 12, 1920. This case must have had the cornea injured during the operation as he developed a large ulcer near upper border with hyphemorrhage. This, however, cleared up and is hidden by the upper lid. The pupil remains uncovered even in upward rotation, as shown by the pictures. The contrast between the two sides gives the appearance before and after. Fig. 8.

CASE 6.—L. N., age 6 years. In this

case the ptosis was the result of injury when three years of age. At that time she fell on a penholder, which penetrated the orbit between the globe and upper wall. It broke into many pieces, several of which were removed by a general surgeon immediately after the injury. Several weeks later, the proptosis remaining, she was brought to me and a study of the case showed a large fragment in the apex of the orbit. At operation this was found firmly set in the optic foramen and was removed. Of course the eye was permanently blinded.

Mota's operation was done on Feb.

24, 1921 without trouble. In this case, instead of pulling the upper lid down to the lower to protect the cornea, I pulled the lower lid up. This I think is the cause of a slight over effect causing about a two millimeter opening during sleep. Outside of this there was no trouble; the aperture is equal to that of the other eye even in upward rotation, while before operation it was three millimeters less. (Fig. 9.) During the three years time the blind eye diverged widely, and to correct this I shortened the internus on April 25, 1921. The result as to the ptosis is shown in Fig. 10.

EXTRACTION OF SENILE CATARACT

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Different surgeons secure the best operative results by different methods of operation. But each must use a technic he has carefully worked out and mastered. This paper sets forth that adopted by its writer for cataract extraction. Read before the Pacific Coast Oto-Ophthalmological Society, July, 1921.

When a patient with senile cataract consults an ophthalmic surgeon, he does so as a rule because he desires to obtain the best possible vision. Any procedure, whether hygienic, medicinal or surgical, that will tend toward such a result should be adopted. Any given surgical procedure executed by one surgeon may not produce so satisfactory a result when executed by another surgeon. Circumstances alter cases. One man who has a large number of cataracts to operate upon daily must become much more adept in certain procedures than another who operates for cataract only occasionally. Therefore, as experience widens, the wise surgeon, seeking always the best results for his patients, follows the line of least resistance and adopts such technic as will give his patients the greatest visual acuity. My apology, if any be necessary, for offering briefly the following suggestions is that they have given me the best results for my patients in an experience of thirty years.

If a patient is under observation for some time before the cataract is to be extracted, it is my custom to administer small doses of bichlorid of mercury and iodid of postassium or sodium, one-twenty-fourth grain of the former and five grains of the latter, to be taken in a half glass of water three times daily after meals, and to be used for a month or six weeks prior to the time of operation. In one of my former clinics, we used to distinguish the combination as the one-two-three mixture, meaning bichlorid of mercury grs. i. sodium iodid 3ii, compound syrup sarsaparilla 3iii, of which one dram was to be taken in a half glass of water three times daily after meals. It was an easy way to designate the formula in the rush of an

afternoon's clinic. If a cataract may be due to some extent to malnutrition of the lens, we know that the above is a socalled alterative and the nutrition of the eye is certainly improved. I have observed repeatedly a poor or sluggish light field become greatly benefited after the use of the above, covering a period of a few weeks. The choroid and vitreous are made more healthy, the subsequent vision is better, and, moreover, it is my belief that there is less likely to be an inflammatory process following the subsequent extraction. We give mercury in an accidental injury to assist in preventing inflammation of the iris and ciliary body why not administer it before an intentional injury to assist in preventing a similar inflammation?

For anesthesia, a four per cent solution of cocaine hydrochlorate is employed. The solution is freshly prepared and is always made sterile by boiling, and I have never seen any marked loss of anesthetic properties because of such preparation. It is important in my opinion that cumulative instillations be made to produce satisfactory anesthesia. Frequently, not only in the operative work of individual surgeons, but in clinics of large eye and ear infirmaries, I have observed cocaine to be instilled prior to operation apparently without any regard to its cumulative effect, and the operators complained that anesthesia of the deeper parts had not been obtained. Many use subconjunctival injections of the anesthetic in order to obtain anesthesia of the iris. For at least a quarter of a century it has been my custom to instill a few drops of the freshly prepared four per cent solution of cocaine at three minute intervals for four instillations, and at the end of the

succeeding three minutes, or fifteen minutes from the time of the first instillation, to begin my operation, and in almost all cases, if the anesthetic be employed in this manner, the iris will be found to have been so thoroly anesthetized that there is scarcely any sensation when it is excised.

The question of extracting an immature cataract or to perform some one of the many socalled maturing operations, seems to be a mooted one. It is a question I presume that each operator will settle for himself. The maturing operations in my experience have produced so much sticking of the lens with subsequent difficulty in delivery and loss of vitreous that I much prefer to extract the lens immature than to operate on one that has been artificially matured. In fact, after sixty years of age, I do not hesitate to extract the immature lens after the cataract has progressed sufficiently far to produce loss of useful vision.

Whether to open the capsule for the extraction of the lens or to extract in the capsule is another question concerning which opinion greatly differs. The ideal operation, of course, is that which gives a perfectly clear pupil at once. If the capsule be badly torn in the center, there may result thickened bands difficult to divide with the dissection knife. On the other hand, unless one is operating constantly in a clinic furnishing a large number of cataracts, his experience is apt to be such that his technic and his ultimate results will be much better by opening the capsule, and performing subsequent discussion if necessary. It is my conclusion that extraction in capsule is not adapted to the American people, nor is it the safest procedure, that is, the one that will produce the best results for the greatest number of patients, in the hands of the average operator in private practice.

It is always my custom when beginning an operation to request the patient to breathe thru the mouth. I am sure that this procedure is an important factor in the prevention of squeezing with the attending loss of vitreous.

The patient continues to breathe in this manner until the eye is closed.

The corneal section I employ is the old de Wecker three millimeter flap, the knife being entered exactly at the corneoscleral junction at a point three millimeters below a tangent to the uppermost portion of the cornea, counter puncture being directly opposite, the portion of the cornea involved being divided as evenly as possible and exactly at the limbus. Should the lens be unusually large, the size of the flap is correspondingly increased, even to including the upper half of the cornea.

There is much objection by some to a conjunctival flap; but as I am confident that with such a flap healing is more prompt and the closure of the anterior chamber more rapid, I always endeavor to make one. Some objection is made that more hemorrhage is thereby produced; but the capsule has not been opened and one may take time to stop the bleeding if it interferes with the further steps of the operation, and I am sure in my own experience that the benefits of rapid closure of the wound with a conjunctival flap override the objections urged against it.

It is my custom always to perform an iridectomy. There was so much trouble with prolapse and subsequent inflammation that many years ago I abandoned the extraction without iridectomy. I believe that an iridectomy performed a few weeks prior to the extraction is the safest procedure of all, but as most patients will not submit to the double operation, it is necessary to content myself with the performance at the time of extraction. If I myself, however, had a cataract to be extracted I would request my operator to perform a preliminary iridectomy, and I insist that this be done in every patient having only one eye.

In the extraction of the immature lens or in any extraction where some cortex is left behind, I irrigate the anterior chamber with lukewarm normal saline solution. The nozzle of the irrigator should be placed within the anterior chamber so as to wash the particles from within outward rather

than the reverse. Since seeing Col. Elliot use his irrigator I have employed that apparatus exclusively and find it very satisfactory. It is always employed at the termination of the operation to replace any portion of the iris that may be caught within the lips of the wound, the nozzle of the irrigator in the latter procedure, of course, being outside the anterior chamber and the current directed from without inward.

Both eyes are always dressed. A few layers of dry gauze cut of a size to cover the field, over which soft absorbent cotton similarly cut, usually about three inches in diameter, held in position by a figure of eight bandage, are applied and over this a Ring's ocular mask. The latter I am sure prevents many possible accidents. Sometimes I use bichlorid ointment and sometimes I do not. I confess I have observed very little difference with and without.

The open method of treatment after a cataract extraction I have never tried. I confess that I have been afraid to do so. Even with the best of care accidents will occur, and patients are usually so curious to ascertain whether or not they can see or how much they can see, that I have been afraid to leave the eye exposed. Moreover, in most of our hospitals there are no special wards or rooms for such cases, so they must be protected not only from interference on their own part, but from the light and interference on the part of others.

At the end of an operation and before the patient is removed from the table, he is requested to lie flat of his back if possible for six hours. By the end of this time in the average case the anterior chamber is closed, the lips of the wound being slightly agglutinated. If for any reason the patient must turn, his nurse is instructed to turn him on his unoperated side. The pressure on the operated eye seems less if this is done and there is less chance also for the wound to open; or, in other words, there is greater chance for the wound to become firmly healed. After the first six hours, the patient may be

turned on his unoperated side if it has not been done before, and in twenty-four hours he may lie on either side. He is instructed carefully, however, not to attempt to turn himself during the first day.

The first dressing is made at the end of twenty-four hours. Unless there has been pain or is some edema at the angle of the lids, the latter are not opened. The lower lid is slightly everted to allow the escape of any accumulated tears, and a couple of drops of one per cent atropin solution is instilled. The latter is employed to dilate the pupil in order to draw away from the capsule the raw surfaces of the cut iris. Warm compresses are applied for a few moments to both eyes and the face wiped, which is very grateful to the patient, and the dressings re-applied. The dressings are changed daily and at the second dressing the eye is inspected by candle light. If the pupil is not well dilated, atropin is again instilled and repeated often enough thereafter at the time of dressing to keep the edges of the coloboma away from the capsule. On the third day the patient is given a backrest, and on the fourth day is allowed out of bed, the unoperated eye being left undressed, an eye shade being used. Should the patient be very old or in such condition that hypostatic congestion of the lungs is to be feared, the change of position must, of course, be hastened; in some cases I have placed them on a backrest from the time of the operation.

In order to keep the patient as quiet as possible for the first two days, the bowels are thoroly moved by purgation and enema the morning of the day of operation and then a saline administered three-quarters of an hour before breakfast on the third day following the operation, the bowels being kept open subsequently by purgatives or enema to prevent straining at stool. This procedure is conducive to firm closure of the wound. Liquids are given on the first day, soft diet on the

second day, light diet on the third day, and full diet on the fourth day. The giving of full diet immediately after the operation is apt to prevent closure of the wound because of chewing the food. Any time from the seventh to the tenth day, depending upon the amount of reaction and the trustworthiness of the patient, the operated eye is left undressed, the eye shade and dark glasses being worn. Hot saline compresses several times a day and atropin two or three times a day are now employed, if there is much reaction, together with ten per cent dionin solution twice daily, if there be any remaining cortex. Should there be very little reaction and no remaining cortex, nothing but the hot compresses which are very grateful, are employed. The patient is permitted to leave the hospital in two weeks if the reaction is not great, but is kept in for a longer period should occasion demand.

Glasses are not prescribed until one month from the time of the operation. If given earlier, injury may be done to the eye and, moreover, the amount of astigmatism scarcely has become settled even in a month.

It is absolutely essential in order to have a smooth operation and to obtain the best results to have only a competent trained assistant accus-

tomed to work with you. As soon as the corneal section is completed, the assistant elevates the speculum to eliminate all pressure from the eyeball. Should the patient become unruly, the speculum is removed and an elevator substituted. Indeed, the elevator is always employed in cases of high myopia or when fluid vitreous is to be suspected. With trained assistance the operator does not have to remove his eye from the work at hand, the proper instruments being placed in his hands in their required order and those used taken therefrom. Each movement of the eyeball can be watched and the least sign of impending danger observed and possibly eliminated.

In a recent number of the Archives of Ophthalmology Gifford has published a paper on backing out of cataract operations that contains many valuable suggestions. Certainly, occasions sometimes arise when for the best interests of the patient it would be well to discontinue the operation and after a proper lapse of time to reattempt operation, perhaps on somewhat different lines.

Blind patients come to us to have their vision restored. That method of operation and after treatment that has given the best results in the hands of any given operator of experience is the best to be employed by him.

NOTES, CASES AND INSTRUMENTS

MICROPHTHALMIA WITH ENCEPHALOCELE.

HOWELL L. BEGLE, M.D.

DETROIT, MICH.

Microphthalmia is often associated with other malformations, not only of the eyes, but of other parts of the body. In the case reported below, monolateral microphthalmia is associated with



Fig. 1.—Microphthalmia with encephalocele.
Begle's case.

an encephalocele, the latter located at the site of its most frequent occurrence, namely, the root of the nose.

T. S., a girl 14 months of age, was admitted to the Children's Free Hospital December 6, 1920.

The father and mother are Polish. While there are four children in the family, this child alone is malformed. The deformity existed at birth, and has undergone no change in appearance. Delivery was normal; forceps were not used. The child has always been well. She is still on the breast and has received no other food than breast milk.

Physical Examination: The child is well nourished and does not appear to be ill. The heart is normal, the lungs clear, and the abdomen, extremities and reflexes are normal. The head is well formed, the sutures closed. The tonsils are enlarged. From the right ear there is a purulent discharge.

The left eye appears normal and vision is apparently not defective. The right palpebral aperture is narrowed and is approximately three-fourths the length of the left. Thru the narrowed lids a glimpse is obtained of a very small cornea, approximately one-third the diameter of the left cornea. When the lids are separated the eyeball, which appears to be approximately the size of a large pea, rotates upward, becomes covered with conjunctival folds and is seen with difficulty. The anterior segment of the globe appears normal.

A rounded tumor, about the size of a half walnut, begins in the median line, slightly above a line joining the two eyebrows and extends downward one and one-eighth inches to the bridge of the nose. One-third of the mass lies to the left of the median line of the face and two-thirds to the right. The tumor is soft, fluctuating and does not appear tender on pressure. There is no visible pulsation. The skin over the mass is of normal appearance and feels free. The tumor appears to rise thru a bone defect, which is located at the normal junction of the frontal and nasal bones, in size corresponding to the end of the little finger. The pedicle of the tumor must be attenuated as the mass can be pushed over to the right, so that the entire bone defect can be felt. Reduction of the mass thru the bone defect cannot be accomplished. When the child cries, corrugations occur in the skin over the tumor and the latter is less prominent.

Stereoscopic plates were made at the hospital and were submitted to Drs. Hickey and Evans for interpretation. They state: "We are inclined to believe that there is an opening in the outer

plate of the skull. The tumor, we think, is connected thru this to the brain."

Under strict asepsis a small needle was introduced into the mass at its apex. Fluid was not aspirated, but for two days a thin clear fluid, resembling cerebro-spinal fluid, appeared in fine droplets at the site of the puncture.

The wound became sealed in three or four days without further leaking or infection.

An operative procedure was under consideration whereby the hernial sac would be tied off and excised and the bone defect closed by a periosteal, or periosteum and bone flap, but as the child developed an acute cold in the hospital, it was allowed to go home and the social service department is now unable to locate the parents.

The occurrence of these two malformations together naturally suggest the possibility of a common origin; but without an anatomic examination of the microphthalmic eye and of the hernial tissue, facts are not at hand warranting comment in this direction. Von Hippel¹ and Parsons and Coats² have reported cases of microphthalmia with encephalocele of the orbit. In a search of the literature, by no means exhaustive, I have not encountered a case similar to the one I have here recorded.

MONOCULAR TRACHOMA

HARRY VANDERBILT WÜRDEMANN, M.D.

SEATTLE, WASH.

In the May number, 1896,³ of the "Annales d'Oculistique," the author published a paper, "La Conjunctivite Granuleuse Monoculaire," reporting three cases of clinically pronounced trachoma limited to one eye, seen during the previous three years. Out of 287 chronic trachoma cases, of which 188 were in the first or granular stage with proliferation of the epithelial elements, 99 were in the third or cicat-

cial stage. He has not kept track of the number of trachoma cases since that time, but they probably number into the thousands. Since the time of the report, he has seen a number of cases of true monocular trachoma, but they were very few in proportion. During the last year he has had two additional indubitable cases which have had considerable treatment.⁴

The report of the three previously published cases and of the two recent ones are here given, as there is hardly any mention in the voluminous literature of this malady affecting only one eye. There seems to be no reason why it should be confined to one eye. During the course of the disease, the infection is probably first acquired in one eye and then transferred by contact to the other, as the opportunity for this infection occurs hourly during the protracted course of the disease; and hence the disease is usually found both together. The translation of the French text of the three case reports of 1896 is first given.

CASE 1.—R. N. R. Age 23. Irish parentage. Train newsboy. Came first June, 1891. The right eye had been affected for several years. He presented a lymphoid degeneration of the superior cul-de-sac and the tarsal conjunctiva, and had a pseudoptosis. The cornea was affected by pannus crassus. He was anemic, and his work on the railroad exposed him to smoke, dust, and other mechanical irritations. He was given cod liver oil and tonics which ameliorated his general condition. Local treatment was given by nitrat of silver, oxid of mercury, and the copper sulphate pencil. The left eye was absolutely normal with 6/V1 vision. After many months of treatment the case was discharged with a vision of 6/XII in the affected eye.

CASE 2.—A. S. Age 30. Irish origin. Railroad engineer. Seen June 10, 1895. He was anemic and lived under unfavorable hygienic conditions. His right eye had been affected about six months and he had seen a number of

¹Hippel, E. von. Weitere Beiträge zur Kenntnis seltener Missbildungen. Archiv. für Ophth. LXIII, p. 17.

²Parsons and Coats. Pathologic report on a case of orbital encephalocele associated with microphthalmos. (Ophth. Society of the United Kingdom). Ophth. Review, 1906, p. 156.

³Reported to Milwaukee Medical Society, 1896.

⁴Reported to Puget Sound Academy May, 1921.

oculists. He presented a picture of grave granular conjunctivitis, limited to the right eye. There was a thin pannus of the upper part of the cornea. He was admitted to the hospital, and treated with roller forceps, brossage and canthoplasty. Two months later he resumed his occupation, returning from time to time afterwards. The following winter he had an ulceration on the cornea, which was healed, resulting in central leucoma. The trachoma was then apparently cured.

CASE 3.—C. E. Age 20. German descent. Hostler. Consulted me February 12, 1896. He was generally healthy, but presented monocular trachoma of the third stage, with cicatricial contraction. The cornea had a complete pannus. He was admitted to the hospital where expression, brossage and canthoplasty were done. He rapidly recovered and was treated later by massage with yellow oxid ointment and boracic acid powder.

The recent cases follow:

CASE 4.—Mrs. T. N. Housewife. Swedish origin. Age 26. Came January 16, 1920, with the history that she had contracted the disease in the right eye six years ago. Her sister had trachoma in only one eye, and had entirely lost her sight, altho she had received much treatment. I did not see the sister to corroborate this. The patient had been under much local treatment with nitrat of silver, blue stone, etc. This is a type of trachoma in the cicatricial stage, with much hard granulation and a moderate degree of pannus. Sent to the Columbus Sanitarium where excision of the tarsus and canthoplasty were done. Subsequent treatment by silver nitrat and copper sulphate. Remained under my personal care for about three weeks and was then treated by Dr. Partlow, of Olympia, with occasional blue stone applications, with cuprol ointment at home. Has been seen several times during the last eighteen months. Returned August 4, 1921, with a hard ridge of granulations on the upper lid. This was excised and on last examination; August, 12, 1921, the eye was quiet. Prescription of cuprol ointment was given

for home treatment. The vision of the right or affected eye, with correction of the refraction, is 6/VIII, of the left 6/VI.

CASE 5.—Mrs. F. A. B. American. Age 25. Housewife. Came January 27, 1921, stating that she had infection in the left eye four years ago. She was a farmer's wife and remembered some of the help having sore eyes. The right eye is perfectly normal, vision 6/VII. The left is practically blind owing to very dense pannus, which has existed for a year or more. She has received much treatment, being subjected nine months before I saw her, to an attempted excision of the tarsus, but this was unfortunately followed by a traumatic ptosis. The left eye was the picture of a trachoma in the cicatricial stage with some hard granulations and a pannus crassus, while the right was normal. We had full laboratory examinations in order to exclude syphilis, tuberculosis, tumor formation, and proliferation. These, together with the Wassermann, blood count, urine and tuberculosis tests, as well as the examination of a piece of the granulation tissue, showed characteristic trachomatous formation. Carbon dioxide snow was used, which cleared the roughness of the lid and the pannus was mitigated. March 3, 1921, at the Virginia Mason Hospital, external incision of the lid was made, and the stump of the levator palpebrae muscle was found and advanced on the lid, producing and over correction which, however, after two months became normal with perfect movement of the lid and perfect closure of the palpebral fissure. Five deep catgut stitches were used. There was some irritation from these resulting in the formation of a lump which, however, gradually passed away, until, at the present writing, the lid is soft and pliable. She has been under constant treatment for six months by carbon dioxide snow, nitrat of silver, blue stone, and on several occasions brossage and excision of any redundant tissue. She bids fair to be under treatment for a long time yet, as the case is by no means cured and granulation tissue persists in forming.

These five cases of special gravity, complicated by pannus and ulceration of the cornea, are somewhat unique. But together with others that I have seen personally, and those that have come under the observation of other ophthalmologists, prove that true trachoma may be acquired and exist in one eye alone without resultant infection in the other.

OPHTHALMIC HERPES ZOSTER.

HAYWARD G. THOMAS, M. D.

OAKLAND CALIFORNIA

M. B. age 55, was sent to the County Infirmary March, 1921 as suffering

from erysipelas. He was treated for erysipelas for several days when an interne, Dr. Froelich, asked me to see the man who was in the isolation ward. Dr. Froelich's diagnosis was herpes zoster, in which I could readily concur. I have reported this case as one of the most complete pictures of herpes zoster ophthalmicus I have seen. The only etiologic factor to be found was the wretched condition of the teeth: pyorrhœa, old roots, etc., which he obstinately refused to have touched. On general "tonic" treatment the eruption gradually cleared, but neuralgic pains persisted for some time. The right upper lid was left with a large cicatrix, but the cornea was untouched.

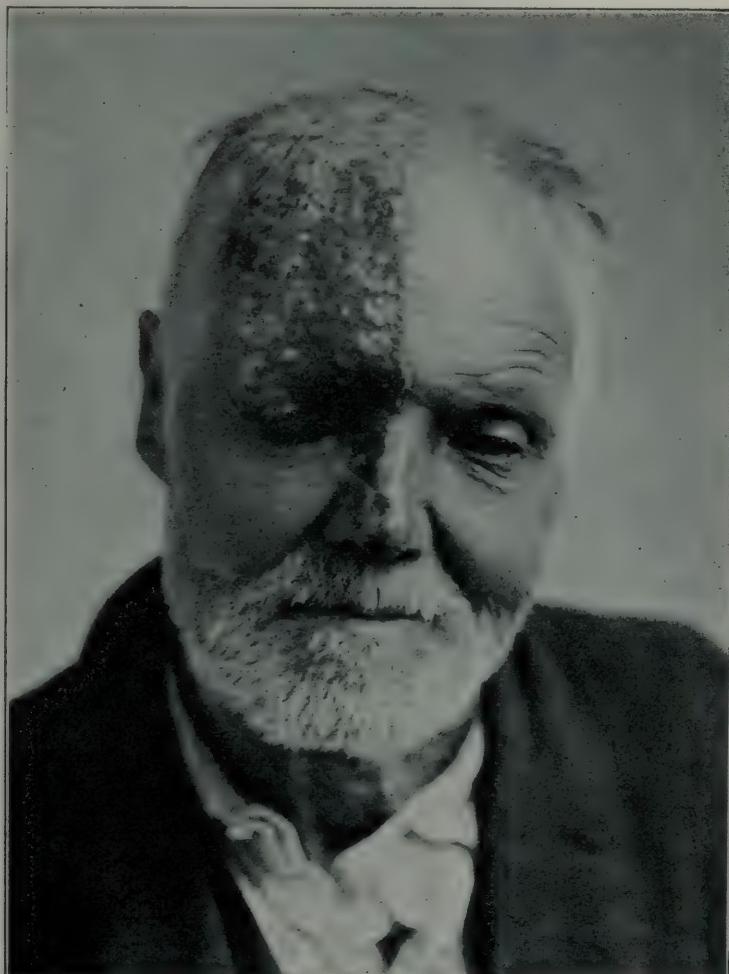


Fig. 1.—Ophthalmic herpes zoster. Thomas' case.

TOXIC AMBLYOPIA FROM ALCOHOL AND COPENHAGEN SNUFF.

EDWARD J. BROWN, M.D.
MINNEAPOLIS, MINN.

The following cases are, perhaps, worth reporting, both for the contrasts they present and for the toleration to alcohol and tobacco, in the second case. Both cases were seen within three days.

CASE 1. Thru the kindness of Dr. C. M. Oberg I was permitted to

Case 2. A. A. 34, W. U. Telegraph lineman. His Norwegian father had been a hard drinker and the boy began to help himself to his father's bottle and snuff box at the age of seven. Since the age of 18 he has used one box of "Copenhagen" daily and has used alcohol freely. Vision R. 20/40 and L. 20/30, O. U.—20/15 with +0.37 cyl. axis 45. The temporal discs are cupped but otherwise the vascularity is about normal. The form fields are mostly inside thirty degrees, red and green inside fifteen degrees and no

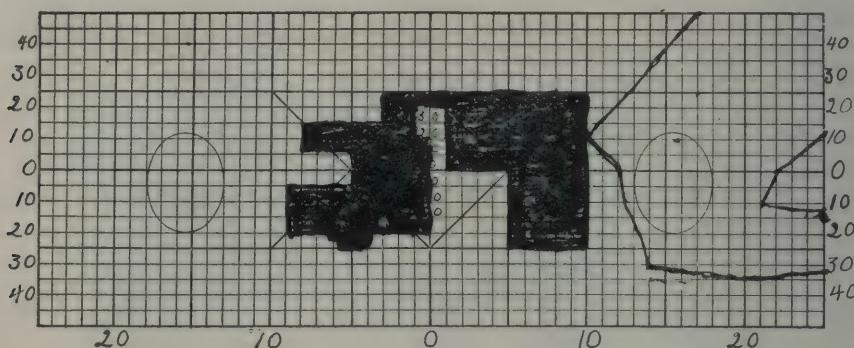


Fig. 1.—Field in toxic amblyopia showing blind spot of right and paracentral scotoma of left eye in Case 1. (Brown's chart.)

examine J. P., 45, laborer, who for twenty years has chewed one box (one ounce) of Copenhagen snuff daily and up to four months ago took six ounces of vanilla extract every night. Two years ago he found he could not see well and the opticians he consulted could not greatly improve his vision. Vision is now R. 20/70 and L. fingers at ten feet, not improved by lenses. There is slight atrophic cupping of the optic discs and the retinal vessels are considerably contracted. The form fields are irregularly contracted from twenty to forty degrees. The blue is nearly as large as the white, and red and green abolished. At a late visit I found vision: R. 15/200, L. fingers at 30". The accompanying chart shows the right blind spot taken on my map at two meters with an 18 mm. object, and the left paracentral scotoma taken with a 40 mm. object.

central scotoma for colors. The blind spots are large but it was not possible to determine their limits. The corneas are anesthetic and the tension 25 and 26 with the Brown tonometer.

EYE COMPLICATIONS OF VARIOLA.

JAY C. DECKER, M.D.

SIOUX CITY, IOWA

Read before the Sioux Valley Eye and Ear Academy, July, 1921.

According to Parsons (*Pathology of the Eye*, 1324) smallpox or variola was a frequent cause of blindness before the advent of vaccination, having been variously estimated to cause one to eight per cent. From thirty eight to seventy eight per cent of the eye complications in variola involve the cornea, and generally show themselves from the twelfth to the fourteenth day.

CASE 1. Mrs. S. V., aged 24, was examined November, 1920. Five days prior, she had what was termed a mild attack of La. Grippe. Two days later the right eye became red and the lids swollen, gradually becoming worse, with a thick yellow seropurulent discharge, marked redness of the conjunctiva, photophobia, and two small white spots of infiltration in the superficial layers of the cornea, which did not stain with fluorescein. A smear made from the discharge showed a very large broad bacillus which was unidentified. No culture was made.

The patient was given a collyrium. She did not return, but three days later she was quarantined for small pox. Subsequent examination showed the conjunctivitis gone, but she still had the two areas of infiltration, which partly disappeared following the use of dionin and yellow oxid of mercury ointment.

The interesting feature of this case is that the eye symptoms began and had reached their climax before the time of the first appearance of the skin eruption.

CASE 2. Mrs. T., age 52. Examined April eighteenth immediately after her release from quarantine on account of variola, stating that at the time of the appearance of the eruption, the right eye became very red and painful, especially complaining of a photophobia and increased lacrimation. Examination showed an iritis in the right eye; and an area of infiltration, in the inner part of the cornea extending from the nasal margin nearly to the center, which did not stain with fluorescein. There were some adhesions of the iris in spite of the fact that the pupil was fairly well dilated with atropin prescribed by the family physician.

After a few days treatment in the hospital, with heat, atropin and salicylates the iritis practically cleared up and the patient was allowed to return home.

On May fourth the eye seemed to be slowly improving. On May twelfth, almost two months after the onset of the variola, the patient returned complain-

ing of increased pain and photophobia and showing a slight abrasion over the area of infiltration. She returned to the hospital, where in spite of all treatment, the ulcer continued to spread and slough for a number of days, until I curretted away all necrotic tissue, when there was a decided improvement within twenty four hours. At the end of two weeks, she was again allowed to go home with the ulcerated area entirely healed over, but still showing slight conjunctival redness.

This case presented a condition which I have not seen before and which I believe is unusual, in that the ulceration of the cornea appeared at least six weeks after the first appearance of the eye symptoms.

In the skin as a result of the hematogenous infection, a coagulation necrosis occurs in the cells of the rete malpighii with a cellular exudation from the vessels of the papillae. By the action of pyococci, the contents of the pock become infected resulting finally in the characteristic pustule. We have all seen, many times, however, smallpox lesions which never progressed beyond the papular stage but which eventually desquamated throwing off a small hard mass of desiccated epithelium which corresponds to the size of the original papule. This I believe explains what happened in this last case. I believe we had here a smallpox lesion which failed to suppurate and yet which later, due to the attempt of nature to throw off the necrotic tissue, brought on the ulceration of the cornea.

According to Del Monte, on the basis of statistics in Italy, corneal lesions of smallpox are frequent in children. In my own limited experience, this has not been the case, as fully seventy-five per cent of the eye complications of variola I have seen were in adults.

The severity of the eye complications is not always proportional to the general disease.

TREATMENT. In the way of prophylaxis, so long as there is only a moderate amount of conjunctivitis which is really a part of the disease, the fre-

quent use of a boric acid collyrium and the applications of a mild antiseptic ointment to the lid margins serves the double purpose of treatment of the conjunctivitis present and the prevention of more serious complications, especially those affecting the cornea.

For the iritis, the usual treatment with atropin, dionin and hot applications generally suffices. For the more severe corneal lesions, as the keratitis and actual ulcers, the same treatment with the additional use of trichloroacetic acid to the ulcerated areas. In cases where there is a necrotic slough which does not detach itself readily, it should be removed by gentle curettage. The continued use of dionin and yellow oxid of mercury ointment, over a considerable period of time, does much to aid the absorption of the corneal scars or infiltration.

PARALYSIS OF CONVERGENCE. REPORT OF CASES.

J. P. ISRAEL, M.D., U.S. P.H.S.

NEW YORK CITY

The following cases are reported, not because of the rarity of the condition, but because it is easy to overlook such conditions.

Of the following cases, one of the patients had been treated at several hospitals and states that at one hospital the doctor advised operation on his eye muscles. Any one who is familiar with ocular muscles can readily appreciate how the busy doctor may slip up on his diagnosis. Too much emphasis cannot be laid upon the importance of the Wasserman test as an aid in diagnosing pathologic ocular deviations whether the condition is due to an individual muscle paralysis or not. To me it is equally as important as proper refraction of all muscle cases. The fact, that two of the three cases reported have positive Wassermann reactions, prompt one to ask the questions: 1. Whether or not we are dealing with a lesion of syphilis, the manifest symptoms of which are a paralysis of convergence; 2. If such is a com-

mon symptom found in syphilis and is being overlooked; 3. Is it an early or late manifestation of syphilis; 4. Where is the center of convergence?

Several of my colleagues have been consulted and all maintain that the center of convergence is in close proximity to the center of divergence, which is located near Deiter's nucleus in the medulla oblongata. I shall not attempt to go into the differential diagnosis of this condition but will say that before making the diagnosis of paralysis convergence, it is necessary to differentiate between: 1. Convergence insufficiency; 2. Paralysis of the individual muscles (internal recti); and 3. Divergence excess.

CASE 1. E. L. H. Age 41. Colored. Male. Admitted to Out-Patient Clinic on March 30, 1921, on complaint of double vision. Past history, rheumatism three years ago. Venereal disease denied. Present trouble started three years ago following an attack of rheumatism. Patient began to see double at that time and this condition has constantly grown worse.

Examination reveals vision R. 20/100; L. 20/70 corrected to R. 20/20 with a plus 50 sphere, plus 75 cylinder axis vertical; L. 20/20 with a plus 70 sphere, plus 50 cylinder axis vertical. Fundus and media clear. Pupils react to light and accommodation. Near point of accommodation 22½ cm. o.u. Examination of extraocular muscles shows associated movements normal in all fields. No individual muscle paralysis. There is exotropia of 14 degrees for near,—1½ degrees of exotropia for distance. Tangent screens shows crossed diplopia in the primary field, not increasing in any other field. Patient unable to converge to the slightest degree. Neurologic examination negative, except some suspicion of inequality of knee jerks. X-ray of skull and paranasal sinuses negative. Blood Wassermann positive. Diagnosis, paralysis of convergence.

CASE 2. H. A. J. Age 22. Colored. Male. Admitted to Out-Patient Department on April 8th, 1921. Complaint, patient constantly annoyed with

double vision. Family history negative. Past history negative. Venereal disease denied. Present trouble dates back seven years, when patient suddenly noticed that everything he looked at appeared to be double. Condition has progressed very slowly.

Examination reveals 20/20 o.u. vision. Media and fundi normal and clear. Pupils react to light and accommodation. Near point of accommodation o.u. 12 cm. Near point of convergence 225 cm. Examination of extraocular muscles shows $7\frac{1}{2}$ degrees of exotropia for near; orthophoria for distance. Associated movements in six cardinal positions all normal. No individual muscle paralysis. Tangent screen shows crossed diplopia in the primary field, remaining the same in all other fields. Neurologic examination reports negative except some inequality in knee jerks. X-ray of skull fails to reveal any pathology in paranasal sinuses. Blood Wassermann positive. Diagnosis, paralysis of convergence.

CASE 3. J. E. D. Age 42. White. Male. Admitted to Out-Patient Department for examination on April 7th, 1921. Patient complained of double vision. Family history negative. Past history of no consequence. Venereal disease denied. Present trouble started three months ago when patient suddenly began to see double.

Examination reveals the findings as follows: Vision 20/20 o.u. Fundi and media clear. Pupils react to light and accommodation. Patient accepts a plus 1.25 sphere before each eye for near work. Near point of accommodation 29 cm. Near point of convergence 150 cm. There is an exotropia of $7\frac{1}{2}$ degrees for near; orthophoria for distance. Associated movements in six cardinal positions normal. No individual muscle paralysis. Tangent screen shows crossed diplopia in primary field, remaining the same in all other fields. X-ray of skull and paranasal sinuses negative. Blood Wassermann negative. Diagnosis: Paralysis of convergence.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

NETHERLANDS OPHTHALMOLOGICAL SOCIETY.

June 13, 1920.

PROF. G. F. ROCHAT, PRESIDING.

Translated from the *Tidschrift v. Geneeskunde* by Dr. E. E. Blaauw.

Tetanus Following Injury.

J. VAN DER HOEVE reported the following cases: 1. A boy was wounded in the left eye while throwing spears; the wound healed. Three nights later, he began to scream, his face was stiff and the mouth could be opened only with difficulty. On the tenth day, he was admitted to the hospital. He had trismus and left facial and abducens paralysis. In the left eyebrow, there was a slight wound, from which pus was pressed and which was connected with a second fistula in the conjunctiva. The vision in the left eye was 2/10. The wound was enlarged; and three days later, there was another about 25 mm. Long wooden splinters were extracted from deep in the orbit, which contained tetanus spores. The patient died sixteen days after the injury in spite of carbolic injections after Bacilli. The temperature never rose above 38°.

2. A three and a half year old child came home screaming with a bleeding left eye. The family physician could find nothing; but five days later the child began to groan. On the seventh day, the mother removed a piece of elder wood, 18 by 18 mm. from beneath the upper lid. The complaints ended; but the boy came to the clinic with a mucopurulent discharge, blepharospasm and slight edema of the upper lid with blue discoloration at the temporal side. In the upper fornix was a wound of the conjunctiva. The cornea was slightly opaque, but the pupil and iris were normal. Four days later, the mother mentioned that the boy could not open his mouth easily. He put his tongue out with difficulty, and the masseters were very tense.

The wood contained strong tetanus poison which killed mice in a short time. In the wound exudate of the mice, tetanus bacilli were found. During sleep, the right facial occasionally contracted. There was complete stiffness of the neck; severe facial cramp, especially left; right facial spasm. The abdomen was tense, but the reflexes not too high. The left oculomotor and abducens were paralyzed; the left facial remained stiff with tetanus. Spasmodic attacks were frequent. The temperature was between 37.4° and 39.4°. One month after the injury, the child was cured; only while sneezing, which happened frequently, was his face distorted on the left side.

The presence of wood in the conjunctival sac is very dangerous; Small wounds here may become foci for tetanus infection. These cases also indicate that the family physician should refer all ocular lesions which he cannot examine thoroughly to the specialist. After traumatism of the orbit, globe or conjunctiva with wood, a prophylactic injection with antitetanus serum should be given.

DISCUSSION. H. Snellen recently treated a woman, 21 years old, who had received a small wound under the right eye, followed by nose bleed, caused by a spear thrown by a boy. A week later, the wound in the skin was closed and covered with a scab, without inflammatory symptoms. The mobility of the left eye was, however, strongly restricted in different directions, indicative of contusion of the muscles or nerves. This, however, could not explain a coexisting paresis of the facial nerve with lagophthalmus of the same side. The right eye showed oculomotor paralysis with ptosis and divergent strabismus, and an extensive choroiditis. These had long been present.

Two days later there was a slight fever, 37.4°; and trismus developed. Antitetanus serum was injected without result. Four days later the patient succumbed.

Fuchs saw a remarkable case of tetanus ten years ago. While a man was busy slackening lime in a hole in the ground, he had an epileptic convulsion and fell forward, but was immediately pulled out. He had lime in the nose, mouth, throat and eyes. Fuchs removed a quantity from the eyes. He was admitted to the hospital and developed tetanus ten days later, and died on the second day following. The peculiarities were that the exposed wounds were very superficial, and that the tetanus developed in spite of the aseptic effect of the lime.

Mulock Houwer wished to know when injection could still be expected to have therapeutic value.

Van der Hoeve thought this could be answered by the experiences of the war. He was impressed with the prominence of paralyses. The facial paralysis is especially important diagnostically. Publication of further cases is desirable.

A New Principle in Cataract Extraction.

A. VERWEY considers the expression, extraction of cataract, incorrect; as the forceps is not yet made, which can extract the opaque lens. He mentions Barraquer's method, which was shown in a film at the Société Française d'Ophtalmologie. He constructed a concave spoon, the hollow handle of which was connected with a bottle with a fixed negative pressure. This was regulated thru a second opening in the front part of the handle, which can easily be closed with the finger. A suction force of 3 m. water height is sufficient for drawing the lens from a pig's eye.

In his experiments, the entire eye hung at the spoon, but the zonule did not give way. He tried suction, but this was less stable. No damage thru escape of the vitreous occurred, but the finer openings in the spoon became obstructed. The capsule ruptured and lens particles were drawn up, lessening the suction power.

DISCUSSION. Van der Hoeve likes Barraquer's operation, because the ideal of removal of the lens in its cap-

sule, without pressure on the vitreous, is obtained. The method was first indicated by Stoewer in 1902, who had a few good results. Like Verwey, Van der Hoeve has experimented according to the indications of Barraquer by connecting his suction apparatus with a water air pump. He succeeded a few times in extracting the lens from pigs' eyes; but he usually failed, or the suction was not strong enough, or the capsule ruptured and lens particles obstructed the tube. He found that in rabbits' eyes, and sometimes in pigs' eyes, the vitreous was so united to the capsule that it appeared a single mass.

Waardenburg asked whether an iridectomy must first be performed, and whether there was danger of hemorrhage with arteriosclerosis.

Rochat feared suction of the iris and difficulty from pupillary narrowing after section.

Verwey did not fear hemorrhage because there is no negative pressure on the deeper parts after suction of the lens.

Van der Hoeve saw the vitreous escape in experiments with pigs' eyes. This danger is less in human eyes but not impossible.

Artificial Immobility for Eye Operations.

G. F. ROCHAT injects one cm. of a 2% novocain solution with adrenalin. The needle is introduced one cm. back from the point, where the vertical tangent at the lateral orbital margin is crossed by the horizontal tangent of the lower orbital margin. The needle, on touching the bone, is directed upward and then along the lateral orbital border; on withdrawal $\frac{1}{2}$ cm. is injected. The same is done below. The injection must take place in the muscle, not subcutaneously. After about fifteen minutes, the orbicularis is entirely paralyzed. The lids are opened slightly; and the patient cannot close them actively. Operation can be performed without any difficulty, and squeezing is avoided. A well applied wet bandage keeps the lids in contact. After an hour, the paralysis has disappeared. There is no disturbance afterwards.

The method has been used in all sorts of operations; extractions of the lens, removal of iron with the giant magnet, iridectomies, trepanation, strabismus, iridectomy in acute glaucoma with much injected bulb, and for optical iridectomy in children, and in deaf people. It has also been used in introducing the hand magnet with presenting vitreous but without loss of it, altho the patient was very restless and squeezed strongly with his sound eye.

The injection is extended by making the superior rectus muscle insensitive. The tendon of this muscle is grasped with the forceps thru the conjunctiva far backward, lifted in a fold, and the needle pushed from below into the belly of the muscle; $\frac{1}{2}$ cm. is sufficient. The fluid must be brought well backward to prevent an undesirable edema of the conjunctiva. After a few minutes, the operation can be performed without the patient being able, voluntarily, to look upward. If he is requested, he can, however, look upward. By this method, the iris was better anesthetized than by simple instillation. The method was also useful in tenotomies and advancements of the interni and externi; but where an over correction is possible, Rochat would not use it.

It seems sufficient to neutralize the reflectoric movements, which is accomplished, as small quantities of novocain paralyze the proprioreceptive fibers of the motor nerves (Magnus and Liljestrand); while the motor fibers still act.

DISCUSSION. From a historic viewpoint, Zeemann mentioned that Straub in 1910 had the same idea and made the injection upon himself. He found that voluntary squeezing increased the intraocular pressure so much that it seemed futile to use these injections regularly. As Rochat often observed a paresis only, Zeemann thinks it probable that the action depends chiefly upon a weakening of the reflectoric tonus of the orbicularis. Altho the method was rejected on theoretic grounds, he has been induced to try it after Van Lint's publication; he was quite satis-

fied with it, but needs more experience before reaching a conclusion.

Weve confirms from his own experience the favorable results of the temporal paralysis of the orbicularis and the intraorbital muscles. He uses a 3-5% novocain solution with adrenalin and a 0.2% potassium sulph., for difficult cases of extraction. He had good success in a case of hysterical spasm of the orbicularis.

Van der Hoeve uses the injection only for special cases; it is not entirely without danger. He rather opposes its use for strabismus operations.

Rochat thinks that, as one cannot regulate a strabismus operation exactly, it does not matter very much.

Herpes Zoster Ophthalmicus with Complications.

C. OTTO ROELFS saw a twelve year old girl on April 8, in whose eye washing soda had fallen. The mother had then washed it out. On the next morning the eye was red, and there were epiphora and headache over it. Two days later, vesicles appeared on the right upper lid and face. On April 14, the skin over the right eye up to the hair was red and full of vesicles. The right pupil was somewhat wider than the left. As the skin eruption had extended, the patient was admitted to the hospital two days later.

An erythema toxicum bullosum was suspected. On the skin, there was an angiokeratoma of Mirelli (Dr. Van der Valk), which had been present for a long time. A few very small inguinal lymph nodes were palpable. There were some painful, submaxillary lymph-nodes and some behind the lower jaw at the right side. Before the left ear was a small painless gland. The condition improved slowly.

Two weeks after admission, the patient complained of poor vision in the right eye and inability to keep it open. With both eyes open she had double vision. She had a right oculomotor paresis with affection of the inner muscles. Lumbar puncture showed only a pleocytosis, 30. This paresis was nearly cured at the end of a week, but pupillary rigidity remained. There was

also a corneal affection like the superficial keratitis punctata of Fuchs. A few months later there was still pupillary rigidity; the cornea exhibited small superficial opacities in the periphery. The iris seemed slightly atrophic at the temporal side; and below two small atrophic gray spots were visible, which he considered scars from a herpes of the iris. Scars of herpes zoster were seen in the skin over the right eye, and there was distinct hypesthesia. After exertion the right forehead became reddened and the right pupil was rigid; but the eye could accommodate 7-8 D. Binocular single vision was present in all directions.

While the patient was in the hospital, varicella appeared in the members of her family. Roelofs thinks that the poison, which in other cases of varioloid, produces herpes zoster, was the cause here. It affected those nerve elements, which on account of the injury and its strong stimuli, were temporarily below par. The first branch of the trigeminus and the Gasserian ganglion were here to be considered. A propagation from the ganglion to the meninges explained the pleocytosis of the spinal fluid.

Roelofs mentioned Verhoeff's findings in a case of superficial keratitis punctata, in which he found necrotic spots directly behind Bowman's membrane, formed by leucocytes.

Roelofs found only a scar condition in the iris, but this may result from the fact that the iris often becomes affected much later.

Roelofs also saw another patient. He treated an electrician for electric ophthalmia of the right eye, following a short circuit. Some months later he returned, complaining of photophobia. He had at that time a typical superficial keratitis punctata, as described by Fuchs; and the iris showed a large atrophic spot at the temporal side. The stroma had entirely disappeared so that the pigment layer was laid bare. Below the pupils were two violet papilla, which with strong magnification showed as vascular conglomerations. The pupils were enlarged and there

were some Descemet spots. One of the papilla disappeared leaving an atrophic spot. The patient was then lost sight of.

In 1918, a dispensary patient showed scars in the iris similar to those of the first case. In both patients the pupillary reaction was lost.

The Light Sense in Myopes.

L. BIERENS DE HAAN examined with four different objects, the vision, the perception circle, the perception extent, the optical extension sense and "point vision," with different illumination and different contrasts. He examined normal persons and 60 myopes. He proved that the vision is rather regularly disturbed in myopes; and that with diminishing illumination and contrast, vision diminished to a greater extent than in emmetropes. But for the optical extension sense, the influence of illumination and contrast appeared less distinct. The speaker draws conclusions regarding the position of the cones and the eventual distension of the retina.

DISCUSSION. Waardenburg referred to the investigations of Steiger, whose conclusions have been accepted by the Swiss ophthalmologists, that the so-called school myopia does not exist; but that the different results of the refraction are a necessary consequence of the combination of the optical constants, determined by heredity (chiefly refraction power of the cornea and axis length of the eye). He knows only one criticism, a posthumous one of Straub.

For him, an uncertain point has always been the distension symptoms at the posterior pole of the eye in slight degrees of myopia. It would be important to investigate as to whether two groups exist, those with and those without distension symptoms, and whether school myopes belong to the first. He asked whether de Haan had made this distinction. He was astonished that de Haan's conclusions had been that in general there was a diminution of the light sense in myopia, tho it was not caused by distension and displacement of the nervous elements. The question then was by what, and

did de Haan know anything about the light sense in hypermetropes.

De Haan replied that he examined only eleven persons in each group so that he did not feel able to decide positively between hereditary, acquired or pathologic disturbance. He would not care to give an explanation of the light sense disturbances found.

Judgment of Professional Demands on the Visual Acuity and of the Loss of Labor Value.

A. VERWEY is impressed with the different demands upon vision for different social situations. The term, vision, is often used indefinitely and very arbitrarily.

He thought that a first step to amelioration and order in this chaos would be made by giving an exact and surveyable representation of the existing ideas; and he considers that he has found something practical. Eleven diagrams illustrate his meaning. He also expressed his idea by making a framework, representing part of a cube. From this cube, the construction of which is based upon figures taken from practice and experience, all important values can be read. It gives a clear representation of the loss of vision after an accident resulting in damage; and this loss has to serve as a principle for the rational determination of the annuity due the patient for the decrease in his labor value. Besides the actual loss of vision, the degree of vision necessary to function in each trade should be considered.

DISCUSSION. According to Schoute, the value of a table was that it comprised in a narrow space a great number of facts, already known. Heretofore, in the determination of the labor capacity there has been a lack of facts. There has been an effort to clear up the subject by creating tables and formulas. The tables are in advance of known facts. Schoute thought it necessary to warn against an impression of certainty, which is involuntarily received from Verwey's table and graphical representation. Schoute does not feel that all Verwey's computations rest on facts. They rest on judgments

of the Hyksverzekeringsbank (the official institution for determining the annuity), and these are nearly always conjectures. Consider the difference of opinion which exists regarding the simplest case, namely loss of one eye.

Verwey declared that he limited himself to vision because one can arrive at a clear representation of this factor. By mutual deliberation, series of numbers can be given and an eventual disturbance quantitatively determined, at least of this one factor. It is true that one does not know the actual diminution in the labor value in different trades; but the first step has been made, which will lead to a generally accepted scale to estimate the loss of labor capacity.

Ocular Affections in Tuberose Brain Sclerosis.

J. VAN DER HOEVE stated that Bourneville first described this condition as tuberose or hypertrophic sclerosis of the cerebral circumvolutions.

Affection of One Half of the Optic Chiasm.

S. P. BAKKER's patient had a carbuncle of the neck in the latter part of August, 1919, which healed in about ten days. At the beginning of September, he complained of poor vision in the right eye. He had photophobia and headache, localized over the eyes. The ophthalmologist found beginning hemorrhagic retinitis. Within two weeks the eye was blind. The rhinologist found the nose negative.

On October 7, a protrusion of the globe of 1.5-1 mm. appeared with slight restriction of all movements, with the exception of those of the superior oblique. The fundus showed papillitis with slight swelling and very tortuous vessels. Vision O. S. was 1, emmetropic; tension —1. Antiluetic treatment, not for specific reasons, was continued, followed by slight improvement and excellent general condition. On October 29, the patient felt suddenly ill, with severe headache, vomiting and fever. Vision O. S. had diminished. On November 3, he was admitted to a hospital. The condition of

O. D. was unchanged. The vision O. S. was much reduced with a temporal hemianopsia bordering over the fixation point. The nasal visual field showed only a slight peripheric constriction. The pupillary reaction was typically hemianopic; O. D. did not react to light but did react consensually with illumination of the nasal field of O. S. The diagnosis was an affection of the chiasm, and the patient was transferred to the neurologic clinic.

Temperature was 39.2°, and there was a trace of albumin. Babinski in left. The sella turcica was not enlarged. The patient succumbed suddenly five days later from respiratory paralysis.

Section of the brain alone was permitted. An extensive basilar meningitis was present, localized chiefly around the chiasm and medulla oblongata. The chiasm was swollen and contained a small opening, from which purulent fluid escaped on pressure. Microscopically, the right optic nerve was thinner than the left; its fibers had nearly all disappeared, their place being occupied by cells. The peripheral part only of the left optic nerve was slightly infiltrated. Near the chiasm, there was a cavity in the right optic nerve, communicating with that which replaced half the chiasm. The left direct bundle remained intact.

The patient was therefore suffering from cerebral abscess, localized in the right half of the chiasm, which perforated and produced fatal meningitis. The wall of the abscess was distinctly visible at the posterior part of the purulent focus in connection with the right tract. A slight leptomeningitis was found at the convex part. Especially at the base, many cells were seen in the pia; while in the medulla oblongata, also, cells were found along the vessels. The cells were chiefly polymorpholeucocytes; here and there foci of staphylococci were present.

The course of the disease may be explained if staphylococci from the caruncle reached the major circulation, thus coming into that branch of the ophthalmic artery which nourishes the right optic nerve. Here they caused

inflammation, which progressed along the lymph sheaths and provoked a cerebral abscess, extending over the right half of the chiasm. Judging a posteriori, the entire process might probably have been prevented by timely enucleation of the globe. There would have been a possibility that the process would not have progressed into the skull.

The right eye had become blind six weeks before death. The left tract was examined according to Marchi. Even then a pathologic granulation behind the chiasm was present, which could be traced thru the entire tract. At the medial side, more granules were found than at the lateral side and center. A heavy granulation was seen at the medio-ventral and medio-dorsal margin especially, the periphery of the lateral field remaining free. As the influence of the inflammation is not known, no conclusion can be drawn as regards the position of the crossed bundle, and also as regards the lateral corpus geniculatum, which showed more pronounced granulation in the medial region, the location of the fibrilization of the corpus quadrigeminus.

DISCUSSION. Zeemann stated that the blood was not examined completely; a hyperleucocytosis would perhaps have given a hint of connection with the furuncle.

The Shape of the Skull and the Orbit.

E. MARX has for years been interested in the influence, which the shape of the head exercises on the orbit and the position of the eyes, and also the influence of the growing eye, if any, upon the orbit. He refers to the opinion of Virchow and Bolk, regarding the growth of the skull bones. If the coronal suture closes prematurely, a compensatory enlargement must take place toward the sides and upward, producing oxycephaly. If the sagittal suture closes too early, the scaphocephalic skull develops with a strong increase in length and height. Besides the scaphocephalus virus and scaphoblobatus (Topinard), a third form seems to exist, which can be considered as a transition toward the oxycephalic form.

The only case report is by Redslob (1909).

Marx's case is that of a somewhat backward and timorous child, especially afraid when someone attempts to touch his bulging eyes. The vision is about 5/10, 1 D. hyperopic. The discs are somewhat indistinctly limited and grayish. The forehead rises steeply and is asymmetric; the right side is flattened, the left somewhat bulging. Over the glabella, a crest begins to rise, extending over the frontal suture, slightly convex to the right. The crest continues over the sagittal suture in a frontal depression, which is nearly parallel behind the coronal suture. The curved nose is convex to the right; the lips are thick; the eyes very prominent; the lids close well. The marked protrusion is contrary to what is usually found with scaphocephaly. The cephalic index is 83.3, strongly brachycephalic, which is a quality of oxycephaly. The exophthalmus must be explained by the orbits being too short. This is an intrauterine development because the general relations of the face and skull were present at birth.

Marx examined 45 normal skulls, 8 scaphocephalic and 6 oxycephalic. The index, which gives the relation of the orbital depth to the greatest length of the skull, is .1 of the medial orbital wall times a hundred giving an average for normal left orbits, 414; for right ones, 411. In oxycephalic skulls, this index is left 453 and right 450; and in scaphocephaly, 423 and 418 respectively. These indices in scaphocephaly, being somewhat larger than in normal skulls, demonstrate that the orbit did not take so great a part in the increased growth in length of the skull, as did other parts.

The deviating skull forms have as symmetric orbits as the normal ones; which confirms the hypothesis that the sutures can dispose bone not only in one direction, but also vicariously in others. The medial wall of the orbit in normal skulls is as an average 2.5 mm. shorter than the lateral; in oxycephaly, this difference is 4 mm.; while in scaphocephaly, the medial wall is 1 mm. longer than the temporal.

These relations must be explained by the general disturbances in growth. The chief cause lies in the skull base.

The orbits in scaphocephaly are somewhat extended in breadth in comparison with the normal, while the orbit in oxycephalic skulls is about normal. But the entrance of the orbit in oxycephaly is smaller in its entirety; its height is reduced, left 1 mm., right 1.5 mm.; but its breadth has lost more, left 6.5 mm., let. 5. mm. One must consider that the orbit is shorter than normal because of the backward development of the frontal bone, which explains the general smallness of the orbital opening.

COLLEGE OF PHYSICIANS OF PHILADELPHIA, SECTION ON OPHTHALMOLOGY.

April 21, 1921.

DR. G. ORAM RING, Chairman.

Retinal Detachment.

DR. ROBERT SCOTT LAMB, of Washington, D. C., read a paper, by invitation, which is published in full in this Journal, p. 668.

DISCUSSION. Dr. H. F. Hansell said that successful treatment of retinal detachment, like that of other diseases, is dependent upon accurate knowledge of etiology and of the morbid process underlying the disease. We must decide in any given case, insofar as we are able, the following: Is the cause essential shrinking of, or the formation of a band in, the vitreous; is it degeneration of the retina itself following inflammation of the ocular tissues; is it exudation, fluid or solid, between the choroid or retina; is it a choroidal tumor; or finally, is it stretching of the sclera as in myopia. It is manifestly wrong to attempt therapeusis, either operative or medicinal, on all or even the majority of cases according to one principle. Indeed, detachment of the retina should be considered rather as a symptom than as a disease. The so-called spontaneous cases are also symptomatic of a causative affection. Failure of treatment may therefore be ascribed to one or two causes, namely, ignorance of the etiology, and the im-

practicability of any line of treatment directed toward the symptom and not the disease.

Dr. Burton Chance stated that the history of the treatment of detachment of the retina is at once the opprobrium of and a challenge to Ophthalmology. It is a reproach, insofar as so few cases have shown reattachment and even partial restoration of function. In the course of the year one meets with many varieties of cases, not all of which can be diagnosed and treated so promptly with such brilliant results as in Dr. Heed's startling case of a few months back. It is not simply the separation of the retinal sheet from its apposition to the choroid with which we have to deal, else we should constantly find immediate, progressive, and permanent widening of the space in every case of perforation of the tunics of the bulb. Indeed one is likely to be astonished to find surgical and other traumatism unaccompanied by detachment.

While our failures are a reproach, there is an increasing understanding of the metabolic processes which affect nutrition and the purposes of the endocrine system in maintaining the functions of the organism; this understanding of the vital processes, Chance holds to be an answer to the challenge by which our past lack of success defies us. Therefore, Dr. Lamb's suggestive contention is most welcome. For us to rely upon the puncturing of the bulbar tunics, by one method or another; or the injection of fluids into a globe which for months had been occupied by fluids retained thru disordered physiologic osmosis, would be, indeed, a reproach. He would urge therefore that such a course of nonsurgical procedures as Dr. Lamb has here outlined ought never to be neglected even after operations. He was greatly interested in the history of a case of wide detachment and disability, as told to him by Dr. Lamb, while in Washington early in February. When later he was given an opportunity to examine the patient the gentleman was able to read a magazine; and the fundi showed concavities free from distinctly raised retinae.

Dr. Peter said: During the past few months I have had under my care

a young woman, aged twenty-eight years, who developed, in the fifth month of pregnancy, rapid loss of vision, and was admitted to the Samaritan Hospital for observation. Induction of labor was decided upon and instituted. The patient's vision, however, became worse in both eyes, and was reduced to simple hand movements at two feet. Examination revealed complete detachment of both inferior halves, with considerable elevation of the detached retina extending well up to the disc. In the upper halves there were numerous areas of beginning detachment. Systolic blood pressure was 240 mm. As the "accoucheur" did not favor the use of hot packs, the patient was transferred from the obstetric to the ophthalmologic department for treatment. This consisted of six weeks of absolute rest in bed, especially on her back. Bicarbonat of soda was administered by mouth daily. The patient received a hot pack daily and free saline cartharsis was employed. At the end of six weeks the patient returned home with complete reattachment of both retinae, and the fundus at this time showed only minute atrophic spots here and there in the attached areas and in the upper parts of the retinae.

Dr. C. R. Heed stated that the case history presented by Dr. Lamb was not a selective one for the Mueller operation. He felt that the present status of a patient presented before the Section at the December meeting substantiates the merits claimed for the scleral resection operation in proper cases. The patient's vision previous to operation was 6/LX, eccentric; one month after operation, 6/XXI; five months later, 6/XXI+, with full visual fields.

Dr. S. Lewis Ziegler was glad to know that Dr. Lamb had found thyroid extract of service in cases of retinal detachment. He first began its use in these cases many years ago, after it proved useful in absorbing subretinal hemorrhages. He now has several cases under observation where the results have been most encouraging. He thinks, however, that cases of traumatic detachment, e.g., following a blow to the head, are the most responsive to this therapy.

He has had a few most excellent results

from posterior sclerotomy in cases that were seen early, but it is difficult to formulate exact rules of procedure since cases that look least favorable recover, while hopeful ones often result in failure.

Choroidal Exudate Simulating a Foreign Body.

DR. HAROLD G. GOLDBERG again exhibited his case of choroidal exudate simulating a foreign body which had been presented at a recent meeting. There was very little change in the appearance of the eyeground at this time, the pigmented area was more sharply defined, and the exudate more completely absorbed, so that it really had more the appearance of a foreign body than when first seen. The eye, at this time, showed no signs of inflammation, and the vision had improved to within one line of normal.

Tendon Transplantation in Paralysis of the External Rectus.

DR. WILLIAM M. SWEET presented a girl, aged seventeen years, upon whom a portion of the superior and inferior recti muscles had been transplanted for the relief of a complete palsy of the external rectus muscle which had existed from childhood, probably congenital. The technic of the operation was somewhat similar to that described by O'Connor. After the tendons of the three muscles had been exposed by a circular incision around the outer half of the cornea, the external halves of both the superior rectus and the inferior rectus muscles, with the overlying Tenon's capsule, were cut off close to the sclera, and firmly secured by separate sutures. Instead of joining the tendons of the vertical recti to separated strands of the externus, as suggested by O'Connor, the externus was completely severed from the globe, after the usual threads for advancement had been inserted. The severed tendon of the superior rectus was then sutured to the upper portion of the stump of the externus remaining on the eyeball, and the inferior to the lower portion, and the externus was then advanced in the usual way, somewhat covering the new points of attachment of the transplanted vertical recti. The cut edges of the conjunc-

tiva were then sutured. The internus was not cut, as it was desired to note the effect of the transplantation with advancement of the externus. Prior to operation the convergence of the left eye was about 30°, with no power of outward rotation. At the end of ten days the patient was able to turn the eye outward 20°. A tenotomy of the internus was then performed. At the end of six weeks the effect of the several operations was a power of outward rotation as measured on the perimeter of 35°.

DISCUSSION. DR. L. C. Peter said the technic employed by Dr. Sweet in this operation simplifies the procedure which Dr. O'Connor adopted in his cases, and which he also used in his own case reported in this Section several months ago. Dr. Clarence Harris and others have used this same technic with good results. He believes it is essential that a tenotomy of the internus be performed at the time of the operation in order to remove the strain upon the stitches. Advancement of the external rectus is equally important even tho there probably will be no innervation of the external rectus because of paralysis of the nerve supplying it. There is considerable elasticity of the muscle which in itself will tend to hold the eye in primary position.

DR. WM. CAMPBELL POSEY said that at the March meeting of the Wills Hospital Society he had exhibited a case of pronounced upward squint in the right eye, in a young man, which had dated from birth. All downward motion in the right eye was lost, except down and in, in which position the eye could be slightly depressed by the action of the superior oblique. Actuated by the success of Dr. Peter's reported case and with Dr. Peter's aid and counsel, Dr. Posey proceeded to transplant the inferior portion of the right external and internal rectus muscles upon the inferior rectus. Examination showed, however, that the inferior rectus muscle was absent, a few strands of muscle fibres at the point of normal insertion of the muscle into the globe being alone present. Hoping, however, that some action might be gained by the transplantation of a portion of the ten-

dons above referred to, this was done, the end of the tendons being sutured to the muscle stump. Free tenotomy of the superior rectus muscle was made at the same time. The results were gratifying, the squint being entirely corrected, the eyes being on the same horizontal plane. Downward rotation for the right eye was also somewhat better. There was but slight reaction.

Traumatic Tenotomy of Inferior Rectus.

DR. P. N. K. SCHWENK showed a patient, aged twenty-eight years, a carpenter's helper, who while at work, March 11, 1921, was hit in the right eye with the end of a board, severing the attachment of the inferior rectus from the globe. He was treated at the Chester Hospital, but the muscle failed to become united to the globe and slid backward into the lower cul-de-sac. When first seen at the Wills Hospital the eye could not rotate below the horizontal plane and the patient was annoyed by the diplopia. On April 14, under general anesthesia, Dr. Schwenk made a horizontal incision across the globe, dissecting well the conjunctiva below the attachments of the cicatrix and at the inner side of the globe. The cicatrix was then loosened from the eyeball, the dense cicatricial mass excised, and the muscle with Tenon's capsule brought up and held in place by two hair pin sutures. One end of the inner thread was passed under the tendon of the internal rectus and the other into the sclera back of the horizontal plane, and the thread tied. One end of the outer thread was passed under the tendon of the external rectus muscle, and the other end into the sclera and conjunctiva, and tied. In order to do this a small slit was made into the end of the muscle and tissues so as to come up under the loosened conjunctiva. The patient has fairly good downward rotation, and at this time is free from diplopia. The stitches will not be removed until assured of muscle attachment.

DISCUSSION. Dr. Geo. H. Cross stated that the case exhibited had originally come under his care and when first seen the torn and bruised end of the

muscle remaining attached to the eyeball was protruding between the eyelids. There was intense chemosis and after the use of cold compresses, a mattress suture was passed thru this part of the muscle, and an attempt made to find the inner fragment of the muscle. Being unable to do so the muscle was fastened well back in Tenon's capsule with the hope that we would be able to correct part of the hypertropia. Without his knowledge he was admitted to the Wills Hospital and fortunately for him came under the care of Dr. Schwenk, who has obtained a perfect result by the unique method he has described.

Ptosis Operation.

DR. CHARLES R. HEED reported the case of a boy, aged three years, affected with congenital ptosis of the left eye. He performed a Motais operation February 8, 1921. Three days after the boy's discharge from the hospital the suture supporting the lid cut thru and the tongue of the superior rectus slipped back away from the lid. He performed a Hess operation upon the same lid March 24, 1921. The three suspensory sutures were removed twenty-three days after the operation, the lid presenting a natural appearance and free from irritation. Two days after their removal an abscess developed along the course of the external suture, the swelling from which obliterated the crease at the outer half of the lid. The abscess was evacuated and prompt subsidence of the reaction was followed by perfect movement of the lid and a natural crease. Dr. Heed felt that sterilization of the sutures by painting with iodin before their removal might prevent such infections.

DISCUSSION. Dr. Wm. Campbell Posey said he thought the Hess operation a procedure of great value and called attention to the fact that the sutures should remain at least three weeks *in situ*, to gain the maximum effect from cicatricial contraction. He also, in several of the cases he had operated on, excised a small elliptical segment of skin from the upper wound margin. This augmented the effect of the lid raising and also was often of value

from a cosmetic standpoint, enabling one to make the folds of skin in both upper lids symmetric.

Cavernous Sinus Thrombosis.

DR. WARREN S. REESE reported (by invitation) two cases of cavernous sinus thrombosis, the first unilateral and secondary to an otitis media. Autopsy showed that the cavernous sinus had become involved by extension thru the bone along the course of the carotid canal. The causative organism was the streptococcus hemolyticus. The second case was bilateral, and resulted from a nasal furuncle. Autopsy was not obtained.

The author reviewed the anatomy, and the literature pertaining to thrombosis of the cavernous sinus, and expressed the hope that more attention may be given to early diagnosis and the development of operative measures, which heretofore have not been very successful, necessary to combat this otherwise usually fatal affection.

DISCUSSION. Dr. Hunter Scarlett referred to a recent article in the Archives of Surgery by Chisholm and Watkins, who collected 12 cases of cavernous sinus thrombosis, while reviewing 50,000 histories of the Johns Hopkins Hospital. The three most common causes were found to be (1) miasma, (2) trauma, and (3) infection, the last named the most frequent. The symptoms resulted from (1) venous obstruction, (2) involvement of the neighboring nerves, and (3) general sepsis. They found that only 7% recovered without operation, and 7% with operation.

Snowball Vitreous Opacities.

DR. T. B. HOLLOWAY exhibited two cases of so-called snowball opacities of the vitreous, and stated that the thought at least two types of vitreous opacity should be differentiated, namely, the snowball opacities and the true cases of synchysis scintillans where we have a deposition of cholesterolin crystals in the vitreous. During the past twelve years he had seen more of the former type than of the latter. He referred to six cases of snowball opacities that had come under his observation since his last report on this

subject in 1917. He called attention to the recent microchemical investigations of Verhoeff, and, while he agreed with this investigator's belief that it was a degenerative process, he questioned whether intraocular angiосclerosis was the most important factor in its production. He felt that more stress should be put on the altered state of the blood and the conditions, whatever these may be, that are responsible for it.

DISCUSSION. Dr. Wm. Zentmayer said that one of the patients exhibited by Dr. Holloway was seen by him at Wills Hospital about one month ago. The vitreous condition was then diagnosed as "synchysis scintillans." From a further study of the case he saw no reason to change the diagnosis. The opacities are of varying shape, apparently flat and surely scintillate. The retinal condition is one of albuminuric retinitis of the arteriosclerotic type with hemorrhages. In the case recently published by Dr. Verhoeff, Dr. Zentmayer had had the good fortune to examine the vitreous as prepared by Dr. Verhoeff for demonstration, and certainly the opacities were of such an appearance as to merit the term "snowball."

Dr. Burton Chance said that he had seen the classically described cholesterolin crystal cases more frequently than such as were characterized by Dr. Holloway as snowball opacities. The case of synchysis which he exhibited is in his judgment nearer to the type of the snowball or asteroid hyalitis than is the case of Dr. Holloway. Of this type he recalls six or seven cases he had seen; two of which were negroes. In all there have been more or less remote changes in the tunics; in none, however, were the changes so extensive as are to be seen in Dr. Holloway's present case.

Dr. Holloway stated that he had already pointed out that the local conditions attending these two types of opacity were the same. He desired to call attention to the fact that these opacities did not have the metallic sheen or glitter shown by cholesterolin, but that they appeared almost a dead white or possibly cream colored, and then

only when in focus; that the character of the movement of the two types of opacity in the vitreous was different; that the snowball opacity behaves much as a buoy and remained white just as long as it was in focus, and this stood out in contrast to the less regular fall of the cholesterolin crystal with its varying scintillation.

DR. CHARLES R. HEED,
Clerk.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

Meeting of August 9th, 1921

Injury to Cornea and Iris.

DR. E. C. ELLETT reported the case of F. H., referred by Dr. Shea July 15. He was hit that afternoon in the right eye by a chip from a hammer, and showed a wound in the cornea and iris to the nasal side, and traumatic cataract. X-ray showed a large foreign body, which was drawn into the anterior chamber by the large magnet. A keratome incision was then made down and out, opposite the location of the body, an iridectomy made and the particle removed with the tip of the small magnet. An attempt to remove the body without making the iridectomy, caused it to catch in the iris and he was afraid to proceed. There has been violent reaction, but no infection, and the eye looks as if it would be lost. The f. b. is 5x2x8/2 mm.

DISCUSSION. Dr. Lewis Levy had a very similar case of foreign body in which a panophthalmitis developed and he had to enucleate.

Dr. Ellett also showed sections from the main portion of the melanotic sarcoma of the choroid, reported by him at the last meeting.

Hemorrhagic Glaucoma.

DR. ELLETT reported the case of Miss P., aged 67, seen in March, 1921. The right eye had begun to fail three or four years before, at which time it was treated. The left eye has always been poor since sore eyes at six. R. vision, moving objects. The details were dim, but the disc seemed to be cupped to the outer side, and some dark

splotches were seen which appeared to be retinal hemorrhages of various ages. Tension 52 Schiötz. L. thin corneal scar. Vision 20/50 with glasses. Urine showed a trace of albumin, Blood pressure 165. A month later the eye became painful and tension rose to 57. The whole cornea was steamy and stained over the lower half. Tension L. 17. The right eye was removed May 26. On section the retina showed extensive hemorrhages, but the gross specimen was not preserved. Sections were shown as follows. (aX) The anterior segment. The angle of the anterior chamber is free, but the cornea shows irregular thickening and superficial degeneration.

(b) The nerve entrance showing marked cupping.

(c) A section of the whole eye, which shows the above features and also extensive retinal hemorrhages in all the layers of the retina.

Metallic Foreign Body Removed From the Eye.

DR. E. C. ELLETT also reported on H. J., referred by Dr. Stevens of Greenville. May 25th was hit in L. by a chip of metal from a hammer. An effort was made to remove the body before Dr. Ellett saw him, May 29. There was a corneal wound to the nasal side, and a dark particle that might be a foreign body on the iris to the outer side. Large and small magnets had no effect. The X-ray was then taken and the foreign body localized in the lens. The small magnet then drew the particle up. The lens was already opaque, and a regular cataract extraction was done. The foreign body did not come away with the lens but was removed with the magnet. 7/22 vision; 20/30 with glasses.

DISCUSSION. Drs. Shea and Simpson thought that the vision would not improve.

Homonymous Hemianopia.

DR. ELLETT reported a case of homonymous hemianopia. Mrs. L. aged 64, experienced a sudden difficulty in sight, speech and memory in Oct., 1920. Central vision was perfect. The fields showed a typical right homonymous hemianopia and the nasal edges of the

discs were a little veiled. The condition has remained the same with no other symptoms, and suggests a left optic tract lesion with involvement of the speech center.

Strabismus.

Dr. Ellett showed two cases.

Case 1. J. E., aged 21. Convergent squint since typhoid at 11. Left eye turned in 35° as measured by the Priestley Smith tape. Vision R. 20/20, L. 6/200. No binocular vision. Hyperopia about 5 D. Squint not improved by glasses but vision of R. was brought to 20/40.

July 9. Resection of the left *externus* and complete tenotomy of the *L. internus* was done. (Reese technic.) There was a good deal of swelling at the site of the resection. Sutures removed on the 9th day, when a small yellow slough was noted at the site of the tendon insertion, or just behind it. A ring of granulation tissue sprang up around this and this persisted till it was cut away on Aug. 3rd, exposing a circular slough about 3 mm. in diameter. It did not involve the whole thickness of the sclera. The slough came away Aug. 5th, and healing has progressed rapidly. The cause of the slough is uncertain as the scleral anchorage is not used in this operation. Perfect cosmetic result.

Case 2. J. C., aged 23. Says the left eye has always turned. Squint 15° , vision R. 20/40, L. 2/200 with glasses, R. 20/25+. Has no binocular vision. July 18. Resection *L. externus* and tenotomy *L. Internus* (Reese technic.) Sutures removed on the 8th day. Six degrees of convergence remained. August 1st, R. *Externus* tucked and complete tenotomy of *R. internus*. Slight over correction but the eyes are parallel.

DISCUSSION. Dr. Savage thinks the best results are from complete tenotomy. He has gotten good results from partial, but has never seen a bad result from complete tenotomies.

Internal Squint of 45 Degrees—Immediate Effects.

DR. A. C. LEWIS reported the case of C. G. a girl of 15 years. V-R. 20/20; L.

20/200 refracted 3 days ago. R+3.00+
 $50 \times 90 = 20/20$; L.+4.00 sph.=20/100.

Had between 45 and 50 degrees of internal rotation of left eye. Duration 10 or 12 years—never wore glasses.

Under local anesthesia a Reese resection of left external rectus was done and a guarded tenotomy of both internal recti.

The result is very promising and probably will not necessitate further operative interference.

DISCUSSION. Dr. Ellett has never been afraid of getting over correction in squint operations. He has recently had a 25° over correction in a case of squint done under ether, but hopes to bring the correction down to normal. He has never seen a good result from a partial tenotomy. He operates for cosmetic results only.

Sclerosing Keratitis.

This case was reported by DR. A. C. LEWIS. Mrs. A. L. W., age 53, was first examined on Sept. 18/20. She had a dense white corneal infiltration 2×4 mm. in size in the outer lower quadrant of the right eye. The sclera and conjunctiva adjoining was congested and thickened. V. R.=20/50—L.=20/20. Media clear in both eyes. Duration 2 months.

1% atropin; 5% dionin and 2% yellow oxid ointment prescribed. Oct. 4. All inflammatory symptoms gone.

July 20/21. Patient returned with similar trouble in left eye. Says it has been sore for a month with dimness of vision. Upper fourth of cornea has a white, milky deposit in the deep corneal tissues. Numerous small peripheral spots at other points. Surface epithelium smooth and unbroken. Circumcorneal injection present as before. Same treatment given for eye plus K.I. gr. XX t. i. d. internally. The opacities are again clearing up rapidly and the eyes are perfectly comfortable again.

DISCUSSION. Dr. Ellett asks if the case was investigated for focal infection.

Dr. Lewis said that the tonsils, teeth, sinuses, and urine had been gone over carefully and that the patient had negative Wassermann.

Dr. Simpson said that great emphasis had been placed on T. B. as a cause, and believes that it is a frequent cause. He suggests a T. B. test.

Alternating Internal Squint with Chronic Trachoma.

DR. A. C. LEWIS reported this case. Mr. C. H., age 40, has been treated for granulated lids for 3 years with only temporary relief. Has never been able to use his eyes together and sees double most of the time. Wears glasses prescribed by him June 5/21. O. U. plus 1.25 sphr. plus 1/2 X plus 1 diopter of

astigmatism in R. and L. respectively, oblique axes=20/20 V. in each eye.

3 days ago (Aug. 6) under local anesthesia Dr. Lewis did a guarded tenotomy of the left internal rectus and a thoro expression of all trachomatous granulations from his eyelids. His eyes measured 20 degrees of internal strabismus 3 days ago and today appear straight, but measure 10 degrees of esophoria. He is not troubled with diplopia today. The eyelids are looking comparatively smooth.

S. S. EVANS, Secretary.

ABSTRACTS

Komoto, J. Luxation of the Eyeball in a New Born. Nippon Gank. Zasshi, March, 1920.

The child came on the second day after birth to the writer with a luxated right eyeball. The cause was probably due to a birth impediment, as the child had on the same side at the hip a large swelling, which on incision proved to be a large lymphangioma, altho it was alleged at birth no forceps were used. The luxation is likely due to an intraorbital hemorrhage, as an incision with a knife showed a large collection of blood.

The author relates his old observation on the luxation of the right eye of a man, who while intoxicated was injured thru a violent contact with a tree stump. He also reports a spontaneous luxation which was astonishingly well described in an old Japanese book, and the cause was given as an inborn relaxation of the muscles, as it is also described in the newest books.

H. A.

Colin, A. Preparation of Eye and Patient for Cataract Operation. Ann. d'Ocul., 1920. v. 157, p. 765.

This consists of two steps; 1. preliminary, 2. preoperative.

Preliminary: a. Asepsis of the conjunctival sac. This consists of the use of 4 to 5 drops of collyrium each morning for eight days before the operation. The collyrium consists of zinc sulph. 2.0, ammonium chlor. 0.75; camphor 0.45, safron 0.10, aqua 150.0; allow to

stand fifteen days before using. b. Asepsis of the lid margins. On the fourth and eighth days before the operation, the margins are vigorously rubbed with a cotton tampon, slightly moist, which has been dipped in a solution tinctur of iodin. No iodin should touch the cornea or conjunctiva. c. Asepsis of the lacrimal passages. On the same days the passages are syringed with yellow astringent lotion, 2 cc. are injected. The permeability of the passages is tested at the same time. d. Education of the patient in opening and closing lids and moving eyes. e. Purging with 25.0 sodium sulphat the night before the operation. f. Bath the night before operation. g. Night and morning of the two days before the operation, the patient is given bromides.

Preoperative: a. Disinfection of the skin of the vicinity with tinctur of iodin, followed by injection of allocain to paralyze the lids temporarily. When the latter is accomplished, vigorous rubbing of the lid margins with tampons of tinctur of iodin. b. Toilet of the lacrimal passages. Several cubic cc. of sterilized water, or in case of doubt of yellow astringent collyrium, is injected. In the latter case, the patient is warned to let it run out of the nose. c. Toilet of the fornices. Lavage with half a liter of sterilized lukewarm water from a special flask.

The author has had more than 200 operations since 1919 without a panophthalmitis.

C. L.

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JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

LETTERS FOR SUBJECTIVE TESTING OF REFRACTION.

Our charts of test letters are used for two entirely different purposes; one to test the acuteness of vision at the point of fixation, the other to test the effect of lenses on the clearness of perception of such letters. For the first purpose the variations in the visibility of the different letters is a defect, but for the subjective testing of refraction these differences of visibility add greatly to the usefulness of the test letters. This is true to a greater or less degree of all alphabets, Roman, Greek, Hebrew or Slavic, or the written or printed characters of any race.

Since charts of test letters have been proposed there has been a general effort to choose letters of visibility as nearly equal as possible. To use letters as a standard of visual acuity this was desirable; and because we cannot get letters of exactly the same visibility, they are inferior to a constant figure, like the broken ring, as a visual acuity test. But their differences of visibility especially fit them for use in

the subjective testing of errors of refraction, and this advantage has not been sufficiently appreciated.

To improve his chart as an instrument for measuring visual acuity, Snellen excluded many block letters, the form he had chosen as best fitted for the purpose. But the fact remains that when constructed on the basis of the five minute angle only two block letters, B and S, come near to testing standard visual acuity. Some have still further restricted the number of letters used on their charts, as Oliver to only seven; and, without getting near the ideal for a visual acuity test, they have to that extent impaired the value of their test cards for the subjective measurement of errors of refraction.

For this latter purpose it is desirable that as many letters as possible should be employed, provided they can be distinctly formed within the same extent of space. A few letters like M, W, I, and J vary so much in the area they occupy that they are not well adapted to the purpose. But within this limitation of equal area, the more different let-

ters we can use for testing refraction the better. It is a great advantage to have on one line of letters those that will require several different degrees of visual acuity to make them out. Thus between L, most easily seen, and B that needs to be nearly twice as large to be recognized, we may introduce several letters of intermediate visibility and thus test four or six improvements of distinctness of perception, on a single line of as many letters.

The fine gradations of accuracy in the correction of an astigmatism or myopia, which a single line of letters can thus afford, is what makes the subjective test the final arbiter of refractive errors, and renders it possible to correct them with minute accuracy. The letters for each line of a test chart should be selected with this in mind. Each line should contain some of the easy letters and some of those it is most difficult to see.

To use test letters to the best advantage in measuring ametropia, two distinct methods should be employed. One is to ask the patient whether a certain change in the glass makes the sight better or worse. This is truly a subjective test dependent on the patient's accuracy of judgment. It requires that the change in the lens should be great enough to make a distinctly noticeable change in the clearness of the letters. It can be tried with the least loss of time, and can be repeated the largest number of times in a given period. But it is liable to lead us into serious errors thru failure of judgment on the part of the patient, unless it is frequently checked up by the other method.

The second method is to require the patient to prove that he sees better by recognizing letters that he has not previously recognized. This adds certainty to the result of changes of glasses made to improve vision, and gives the testing with letters the value of an objective test. To carry this out it is necessary to have test cards with which the patient has not become familiar. For this reason it is worth while to have samples of all the good test cards that can be secured, and to take a fresh

one every time one needs to test with a line of letters that the patient has already learned on the card in use. This need to change the card occurs chiefly when using the lines of smaller letters such as indicate standard or nearly standard vision. To meet the need quite a small card is all that is necessary, and a series of such supplementary cards has been found very convenient.

Finally, no set of test letters is complete unless it includes one or more lines that require better than standard vision, to recognize them at the distance at which they are used. It is not enough to have the patient show standard vision, the subjective measurement of refraction is not complete until the eye has shown the best possible vision of which it is capable; and this is sometimes double standard vision. The better the vision of which the eye is capable the more likely it is to be annoyed or strained by an inaccurate correction.

E. J.

A GREAT MEETING.

The gathering of five hundred Fellows of the American Academy of Ophthalmology and Oto-Laryngology at Philadelphia, altho some staid away because they could not attend both this and an International Congress six months later was in itself a notable achievement. But this record-breaking attendance was overshadowed by other features that made the Academy's celebration of twenty-five years of growth and progress of unique significance.

The three days graduate course helped to swell the attendance. It was known in June that the 350 seats that would be provided for those who wished to see and hear the demonstrations had all been taken. But with provision for those who were to give the demonstrations, a few guests and a number who came long distances hoping for a chance to get the opportunity, the lecture room of the Academy of Natural Science was packed with almost 500 at each of the joint

sessions. The number present at the opening of the course, Wednesday evening in the ball room of the Bellvue Stratford hotel was much larger.

This opening meeting was addressed by the eminent foreign guest of the Academy, Prof. J. Van der Hoeve of Leiden, and Prof. Ernest Sachs of St. Louis. Another foreign guest was Prof. Fuchs of Vienna. Both he and Prof. Van der Hoeve while speaking with a noticeable foreign accent were able to choose their English words with such excellent judgment as to make themselves clearly and easily understood. The next evening they addressed in similar fashion a meeting of the Section on Ophthalmology of the Philadelphia College of Physicians that packed the Wm. Thomson lecture room of the college, while those who came late were unable to get in.

Both in the graduate course and in the regular scientific meeting, in which the foreign guests repeatedly took part, the use of the projection lantern added greatly to the interest and value of every session. Many of those who opened the discussions on the papers presented had carefully prepared and written out their remarks.

There was very little of the unprepared desultory discussion that too often protracts the sittings of scientific meetings.

The special exhibit of pathologic histology at the laboratories of the University of Pennsylvania was too far from the place of meeting to draw any large number at 5 o'clock on the third day. But those who attended it found a larger and better arranged collection of slides under the microscopes than even those shown last year.

But the event which promises most for the Academy and for the profession was the adoption of the working agreement with the office of the Surgeon General of the Army for the establishment of a Museum of ophthalmic and oto-laryngologic pathology. Fellows of the Academy are to preserve their specimens and send them to the Surgeon General's Office. There they will be prepared, cut, stained and mounted for microscopic study. Speci-

men slides will be sent to the donor of the specimen. Others will be studied by specialists in ophthalmic or oto-laryngologic pathology who will report on them. Slides, photographs, and diagrams of important conditions will be prepared, which will be loaned to those Fellows who desire to use them for illustration or teaching.

There were other notable features of the meeting, as the holding of examinations both in ophthalmology and in oto-laryngology, for candidates who desired admission to the Academy, of whom a large number were passed. But enough has been told to demonstrate the great importance of this particular meeting, and the probable value of the meeting to be held next September in Minneapolis.

E. J.

CORRECTIONS.

In the paper by Dr. John M. Banister on the Surgical Treatment of Concomitant and Paralytic Strabismus in the September number of the JOURNAL, on page 660, column one, line 18 "about 40 mm. linear measure" should read, "about 4 mm. linear measure."

In the discussion of Dr. Satterlee's paper on "Problems in Prescribing Prisms" by Dr. E. E. Blaauw, in the August JOURNAL, page 628 column one, line 27, "chorioretinal changes" should read "lenticular changes."

In the paper by Dr. P. J. Waardenburg on "Encephalitis Lethargica" August JOURNAL, p. 584 column two, line 31 "Liegebeek van Henkelom" should read "Siegenbeek van Henkelom"; and in the Bibliography of this paper, p. 591, line 15, the name should appear "Van Henkelom, Siegenbeek."

BOOK NOTICES

Wilbrand, H. and Saenger, A. Die Neurologie des Auges, VIII Band. Bewegungsstörungen der Augenmuskeln. Large 8 vo, 496 pages. 6 plates and 40 illustrations in the text. Munich and Wiesbaden: J. F. Bergmann. 1921.

It is a little over a year since the seventh volume of this great work was

reviewed in this JOURNAL (v. 3, 1920, p. 630), and in that time we have noted the death of Prof. Saenger. Such a treatise was only made possible by the closest collaboration of an ophthalmologist and a neurologist; and it is fortunate for our profession that they both lived to complete so much of it. Of the general character and value of the work we have already expressed the highest opinion. There has been no falling off of thoroness or narrowing of scope in this volume.

The pathology of the centers and tracts directly controlling the eye muscles is here most fully set forth. The anatomy of these nerve tracts is first considered under the headings, cortical centers, association centers, the nuclear region, the nerve roots and the nerve trunks. Then the eye movements are considered. The typical include fusion, voluntary, reflex and associated movements; the atypical include the disassociated movements of the new born, those occurring during sleep and those related to pathologic conditions. Retraction movements and the field of fixation are then considered.

The greater part of the book deals with the paralyses of the eye muscles. These are considered under the headings, cortical and supranuclear, nuclear, nerve root palsies, basal, those arising from disease of the cavernous sinus or within the orbital fissure, orbital causes, those arising in the muscle, and the purely functional paralyses, as those of hysteria.

Then the spasms of the eye muscles are taken up, about 90 pages being given to nystagmus. Under nystagmus of toxic origin, some 25 different substances are mentioned as liable to cause it. But it is notable that carbon monoxide is not one of these, and under the heading of miners' nystagmus, the views of Butler with regard to the share of chronic coal gas poisoning in causing the condition receive mere mention. The whole subject of miners' nystagmus is discussed in less than six pages; but the more than thirty references here given to the literature open up the subject most effectively to the student who desires to pursue it.

Nystagmus arising in disease of the brain is given 25 pages and is considered under the headings of 19 different conditions. Its connection with 5 different diseases of the spinal cord is accorded 4 pages; and as accompanying 20 varied conditions of the general nervous system 20 pages are devoted to it. It also receives some attention in other sections of the work, particularly that dealing with reflex movements. Striking evidence of the rapid development of our knowledge of lethargic or epidemic encephalitis is found in the fact that in this work just published it is only briefly mentioned. (Page 100 and foot note to p. 178.)

One might expect in this or the next volume some account of comitant strabismus. But it is not taken up in this or any of the preceding volumes; and it is announced here that the ninth and concluding volume, to appear soon, will deal with accommodation and the pupil, which were to be considered in volume eight. The view that strabismus is essentially an abnormality of the ocular muscles rather than of the nervous system has been a great obstacle to a good general understanding and rational treatment of it. Apparently this view has excluded its consideration from this generally complete and valuable work, an omission all the more to be regretted because outside of the French literature the neurologic aspect of comitant strabismus has been neglected.

E. J.

Festschrift zur des Siebzigsten Geburtstages Herrn Hofrat Prof. Dr. Ernest Fuchs. Octavo, 1232 pages, 6 plates and 326 figures in the text. Berlin, Julius Springer.

This volume, prepared by the friends and grateful pupils of Prof. Fuchs, is a noble and well deserved commemoration of his seventieth birthday and his long and fruitful career as a teacher and investigator of ocular pathology. The exceptionally good photographic portrait which serves as a frontispiece will add to the value of the volume for many who know him only thru his published work. The work is printed as

Volume 105 of Albrecht von Graefe's *Archiv für Ophthalmologie*. This is particularly appropriate, for no one has done more than Fuchs to keep alive and to advance this JOURNAL which serves as the most conspicuous monument of its founder.

The papers contributed to this volume will be found noticed in Ophthalmic Literature under their appropriate heads; and some of them will appear in abstract in this JOURNAL. They number 73, contributed by 75 authors. Of these contributors, 1 lives in Finland, 2 each in Holland, Sweden and Norway, and 3 each in Switzerland and Denmark, while 62 live in what were Austria and Germany, before the World War. This distribution does not reflect the world wide dissemination of pupils and friends of Prof. Fuchs, but rather the disturbance of the relations of scientific men by the great conflict, and the selection of those who arranged this tribute.

The typography and press work of the book are of the excellent quality of the journal of which it forms a volume. Altho there are no color plates, several illustrations in color have been printed with the text. It is a volume that may be viewed with pride and satisfaction by the eminent ophthalmologist to whom it is a tribute, and by those who have contributed to its pages; and it contains much that will be of value to all students of ophthalmology.

E. J.

Thomas G. Atkinson, M.D., B. Sc., Oculo-Refractive Cyclopedie and Dictionary. 432 pages. Chicago. The Professional Press, Inc.

This book of 432 pages purports to be a complete unabridged encyclopedia, and dictionary of words and terms dealing with the refraction of the eye and associated subjects assembled in a coordinated form. It has been written and arranged to be of maximum usefulness to the practicing "refractionist," this title being defined on page 372 as "one who is skilled in measuring and correcting errors of refraction of the eye." This is a title that

has been usurped by opticians, and is ignorantly used by some physicians. The word is etymologically incorrect, and not good English as applied to the science of optics, for it means one who rebends or rebreaks, and not what it is sometimes held to mean.

For a student of optics, the work has some immediate value, for he may turn to its pages for the definition of a technical word and for its relations to optics. In so far as this goes, it is a book for him, and for the optician. It is well printed and bound and sparsely illustrated with diagrams and cuts of instruments.

H. V. W.

A Treatise on Cataract. Donald T. Atkinson, M.D., San Antonio, Texas. Octavo, 150 pages, 29 plates. New York City. The Vail-Ballou Company.

This book, which contains about half as much letter press as one number of this journal, is well written, printed in large type and illustrated with good plates. Of the plates all but three refer to cataract operations, showing particularly the manner of using the operator's hands and holding the instruments. The scale of the reproduced photographs is not large enough to bring out the finer details of puncture incision, etc. But a half dozen diagrammatic drawings show these details better.

The book adds nothing new to our knowledge of cataract or its removal. But it brings together and states clearly and briefly some of the best methods of procedure that have been worked out by the combined experience of our profession. It passes judgment on some of the more recent innovations, rejecting extraction in the capsule, but approving Col. Smith's reasons for disapproving of the conjunctival flap.

The author, by study, observation and experience, has come to definite views with regard to the different points of cataract operations, and sets them forth briefly and clearly with the aid of illustrations, all of which are original and carefully planned. E. J.

Die Diathermie und Lichtbehandlung des Auges. Dr. Med. Leonhard Koeppe, Privatdozent fur Augenheilkunde an der Universitäts-Augenklinik zu Halle a. S. Octavo, 218 pages, 63 figures in the text. Leipsic, F. C. W. Vogel.

This work is a description of methods rather than a statement of results obtained, altho the results are often given incidentally. The figures consist of diagrams illustrating theoretic explanations and halftones showing the apparatus employed and how to use it.

The first part of the book, on diathermia, begins with an introductory and historic review of the subject. Then it takes up the physics, physiology, apparatus and technic of its employment; and after that the special action of diathermia currents on healthy and diseased human eyes. The latter is arranged by anatomic parts, as the lids, conjunctiva, cornea, iris, lens, etc., with special chapters on its influence on intraocular tension and the orbit. There are also bibliographies appended to the different chapters, and one on high frequency and diathermia currents.

The second part of the book, 35 pages, is devoted to the phototherapy of the eyes. After a brief introduction it takes up the treatment of tuberculosis of the eyes with light rays. The theoretic basis and the nature of the light used are first discussed, and then the special apparatus employed and the details of the method. A third chapter briefly goes into some clinical aspects of the subject.

The third part of the book, 28 pages, deals with the treatment of eye diseases by ultraviolet radiations. This, after some general introductory consideration, also gives a chapter on special apparatus and details of its use; and then devotes a chapter to the ultraviolet treatment of trachoma. One chapter is given to this treatment for tuberculosis of the conjunctiva and cornea, and one to corneal ulcer and scrofulous affections with notes on indications and contraindications for this kind of therapy. This part ends with a list of references to its literature.

There is no index, but the table of contents is fairly full, and the book is intended as a guide to the beginner in the special methods here set forth. It gives very little that would help the reader to an estimate of the relative importance of these kinds of treatment.

E. J.

CORRESPONDENCE.

RELATIONS OF OPHTHALMOL-OGIST TO OPTICIAN.

To the Editor: Returning from an extended Eastern trip, in the search of light and truth, shocking almost beyond expression were the writer's impressions of the general unethical relations between the oculist and optician in America. He was well aware of the conditions West of the Mississippi, but expected to find them better in the sites of learning and teaching. But close inquiry in the larger teaching places of the East and the middle States, leads to the conclusion that many of the rank and file of the "eye doctors" are accepting rebates or commissions from opticians, and even some real ophthalmologists are not exempt from this imputation.

The general profession is "getting on to" these conditions and that it is adverse to commercialism in ophthalmic practice is shown by resolutions against it passed by local and county societies as noted in the action of the King County Medical Society of the State of Washington, an excerpt therefrom being printed in this issue under News Items.

Are we going to keep this up, to prostitute the Hippocratic oath and sell ourselves for a few pieces of silver? It is true that it is hard to pin down the conspirators. It is not well to mention names or even localities, but I will risk the general assertion that the largest city in our country and also the next largest are notorious in this regard. In striking contrast are the Cities of "Brotherly love," the "Hub" as well as the professional men who practice under the dome of the Capitol and its nearest large city, where oculists who take rebates soon become known and are ostracised.

The fact is that the professional income of the rank and file of the Eastern ophthalmic men, is nowhere near that of those in the West. They do much more eleemosynary work than they do of private practice. The well-paying patients, and especially those who come with the larger operative fees, go to but a few men in each locality; and the temptation to a young man or one who is just managing to get along, to get a few easy dollars, *sub rosa*, as a rebate or commission from the optician for the sale of glasses to his patients, is indeed great.

Where the standard of ethics is especially high, as in Philadelphia, Washington and Baltimore, even the sale of glasses, direct by the doctor to his customer, is not considered as being *haute monde*, altho it is really ethical if the patient knows for what he is paying, and is essential in some localities where good optical service is not available. But when the surgeon sells only his brains, it has been found that the morale of the optical trade has been uplifted, and that the ophthalmologist who does not dispense glasses, really profits in a general way more by referred cases from the optician than he would if he, too, would be a tradesman and a trafficker in picayune profit taking.

HARRY VANDERBILT WÜRDEMANN,
Seattle, Wash.

DR. WEEK'S VISIT TO PEKING.

To the Editor: Dr. John E. Weeks of New York City, President this year of the American Ophthalmological Society, together with Mrs. Weeks spent three weeks in Peking, China, on their recent tour of the orient. It was a great pleasure for me, Dr. Li and our assistants, members of the Department of Ophthalmology of the Peking Union Medical College, to have Dr. and Mrs. Weeks with us.

This institution, as is probably known, has been taken over and is being maintained by the China Medical Board of the Rockefeller Foundation. Unfortunately we were at that time still working in the old hospital, the new plant not being ready for occupancy until July 1st, so we did not have the pleasure of showing Dr. Weeks our new quarters in operation. Dr. Weeks made several visits to our clinic and was shown a number of our most interesting cases.

The faculty and the ladies of the Peking Union Medical College tendered a tea and reception to Dr. and Mrs. Weeks, after which Dr. Weeks delighted us with an account of some of his professional experiences.

HARVEY J. HOWARD.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu. Volunteers are needed in other localities.

DEATHS.

Dr. Stephen C. Ayres, Cincinnati, Ohio, died September 1st, 1921, aged 79.

Dr. James A. Black of San Francisco, California, died September 17th, aged 52.

Dr. Walter L. Chase, Bedford, Mass., died August 8th, aged 52.

Dr. Edgar J. Howland, Goldfield, Nevada, died in August, aged 61.

Dr. Justin L. Jackson, Savannah, Ga., aged 46, died August 11th from typhoid fever.

Dr. William F. Julien, Gary, Ind., aged 46, died June 11th from pneumonia.

Dr. Walter W. Parmalee, Auburn, Me., aged 47, died September 3, following an operation.

Dr. Rohmer, of the University of Nancy, died recently.

PERSONALS

Dr. C. Duane Cobb, formerly of New York, has moved to Oakland, California, with offices at 1225 Washington street.

Dr. Conrad Berens, Jr., announces that Dr. Ray R. Losey is now associated with him at 9 East 46th street, New York City.

Dr. J. N. Roy has been made Prof. of Ophthalmology in the University of Montreal.

Dr. Mary K. Heard formerly of Iowa City, Iowa, has moved to Des Moines, Iowa, with offices 317-318 Kraft building, Seventh and Walnut streets.

Drs. Gifford, Patton, Calfas and Potts announce the removal of their offices to the Brandeis Theatre building, Omaha, Nebraska.

Dr. John O. McReynolds of Dallas, Texas, writes from Barcelona that he has had a wonderful visit with Barraquer, and promises to write all about it on his way home, while on the boat.

In the August number we referred to Dr. M. Uribe-Troncoso, of Mexico, as if he were still living there. This was an error. He has been a resident of New York for five years.

Dr. Harris H. Vail announces that he has established his offices and private hospital in association with Dr. Derrick T. Vail, at 24 East Eighth street, Cincinnati, Ohio. Practice limited to diseases of the ear, nose and throat.

Dr. L. Webster Fox, of Philadelphia spent his summer vacation in Honolulu and was

more than pleased with everything the Islands had to offer. The oculists entertained him in royal style. On his return to the mainland he was entertained at luncheon by the local men of San Francisco.

SOCIETIES.

The Buenos Aires Ophthalmological Society has designated Drs. de la Vega, Gil and Soriano, official representatives to attend the International Congress of Ophthalmology and present papers.

The American Academy of Ophthalmology and Oto-Laryngology has just held its twenty-sixth annual meeting in Philadelphia, October 17-22, with the largest attendance in its history. It will meet next year in Minneapolis. Dr. Walter R. Parker, of Detroit, was elected president.

At the September meeting of the Indiana State Medical Association, Indianapolis, Dr. J. A. Stuckey of Lexington, Kentucky, was the guest of honor of the Section of Ophthalmology and Oto-Laryngology. The subject of his paper was "Some Phases of the Trachoma Situation." Others on the program of the section were Drs. W. A. Hollis, Hartford City; C. N. Howard, Warsaw; D. O. Kearby, Indianapolis; Harry Boyd-Snee, South Bend; W. F. Molt, Indianapolis; George F. Keiper, La Fayette; George W. Spohn, Elkhart; M. H. Krebs, Peru.

Thru the efforts of the Louisville Eye and Ear Society and Dr. J. A. Stuckey of Lexington, who is now President of the Kentucky State Medical Association, a section on Ophthalmology and Otology was organized at the recent meeting of the Society at Louisville, September 19th, 1921.

The initial meeting of the Society was held in connection with the annual meeting of the Kentucky State Society. Forty-one registered as charter members. A part of the day was spent in case reports and scientific discussions and a banquet closed the successful session.

The following officers were elected: President, Dr. S. G. Dabney; Vice-President, Dr. Adolph O. Pfingst; Secretary, Dr. G. C. Hall; Treasurer, Dr. D. A. Lederman, all of Louisville. Drs. Dan. M. Griffith, Owensboro; A. B. Carson, Henderson and J. A. Stuckey, Lexington, were named members of the council.

It is the intention of the Society to meet each year on the day previous to the Kentucky State Society.

The Ophthalmologische Gesellschaft in Wien met August 4th to 6th, 1921, and was a great success. In all, sixty-one papers were read before the society, and the discussions were entered into by many besides the Viennese. Abstracts of the papers will appear later in the JOURNAL.

MISCELLANEOUS.

Charlotte, N. C., is to have an Eye, Ear, Nose and Throat Hospital. The building to cost \$125,000, one floor for private offices.

The Society for Cinematographic Instruction in Medicine and Surgery has been organized with address at 105 West 73rd street, New York City, to develop and assist in the educational use of motion pictures in medicine, surgery and dentistry.

A new motion picture film in one reel has been produced by the National Committee for the Prevention of Blindness. The film tells of the experience of a mother and her child with blindness, and shows how preventive measures may be applied in order to save the eyes of many of those who thru negligence later lose their sight.

At the meeting of the Council of the American Academy of Ophthalmology and Oto-Laryngology, held in June, it was decided to establish a museum, the collection to be located in the Army Medical Museum at Washington, D. C., and conducted by the curator, the expenses to be borne by the American Academy of Ophthalmology and Oto-Laryngology. Under the regulations of the Army Medical Museum, the pathologic material is open for study to any qualified person; and laboratory and microscopes are available.

September 25 was the date appointed for the unveiling of the memorial to Brisseau of Tournai, Belgium, who published in 1705 the first account of the nature of cataract. The committee in charge of the memorial has republished his account in a pamphlet as a souvenir and bibliophile curiosity. For information address Dr. A. de Mets, 29 avenue

Van Eyke, Antwerp. The ancients explained cataract as the pouring out of some substance on the lens from above, and hence the name "cataract."

The American College of Surgeons, with offices at 40 East Erie street, Chicago, Illinois, announces for its Department of Literary Research that it is ready to assist Fellows of the College and members of the surgical profession in their medical literary work thru the preparation of bibliographies, abstracts and translations, the compilation of such material or other editorial work. For such assistance a minimum charge will be made to cover the actual expense of the work.

At the May meeting of the King County Medical Society, Seattle, Washington, the following by-law was adopted:

"Any physician who shall procure for profit a patent for a remedy or for an instrument of surgery, or who sells or is interested in the sale of patented remedies or nostrums, or shall give a certificate in favor of a patented or proprietary remedy or patented instrument, or who shall enter into agreement to receive pecuniary compensation or patronage for sending prescriptions to any apothecary or for sending orders to an instrument manufacturer or retailer or optical company shall be liable to censure, suspension or expulsion in accordance with Article III, Section 8; (it being the intent of this clause to prohibit the acceptance of rebates or commissions, but not to prevent a physician from selling to patients drugs, appliances or spectacles and eye glasses when in his opinion the patients' interests may be protected by so doing.)"

This procedure has effectively settled the question of rebates from opticians to oculists in Seattle, and it has removed the stigma of commercialism from the ophthalmologists of this locality, as those who previously conducted business in this manner have accepted the decision of the governing body with good grace.

This movement will no doubt proceed throughout America, especially as the opticians themselves have the matter under discussion, with prospect of radical action.

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FIG. 1.—CONJUNCTIVAL PHLEGMON ONE DAY AFTER OPERATION



FIG. 2.—APPEARANCE OF EYE TWO DAYS AFTER OPERATION.



FIG. 3.—CONDITION SEEN AFTER FOUR DAYS.

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PHLEGMON OF THE CONJUNCTIVA FOLLOWING OPERATION.

FREDERICK A. KIEHLE, A.B., M.D., F.A.C.S.

PORLAND, OREGON.

This is the report of a case in which a simple operation for pterygium was followed by loss of the eye. The only organisms found were a few streptococci and staphylococci not pathogenic for animals. Read before the Pacific Coast Oto-Ophthalmic Society, July 15, 1921.

The following case, one of the most distressing the writer has ever had to deal with, is important as illustrating what can happen despite the greatest precautions, with usual technic and under conditions ordinarily accepted as aseptic. For this reason, and because I fail to find in ophthalmic literature or in the practice of my confreres record of any similar experience, I am impelled to make this report.

Mrs. C., aged 35, consulted me November 9, 1920, regarding a small pterygium of her right eye in the usual position at the inner side of the limbus. The growth was small and there was no interference with vision, which was normal. Only cosmetic reasons and the constant curiosity of her friends and acquaintances regarding the growth induced her to seek consultation.

Operation was not urged and it was carefully explained that the growth was innocuous and might never interfere with ocular function. However, on December 29, she reappeared with her husband and requested operation. As she was from out of the state and only visiting friends in Portland, she asked to go to a hospital. I mention this because we are accustomed to operate on pterygia in our office surgery.

Arrangements were made at the Portland Eye, Ear, Nose and Throat Hospital for operation the following morning. No preliminary culture of the contents of the conjunctival sac was made, as is our custom before proceeding with the more important ophthalmic operations. In the surgery,

however, the eye was given as careful preparation as for an intraocular section. There was nothing unusual in the appearance of the eye or the accessory structures. Lids and conjunctiva were normal and tear sac negative. The technic of the operating room was absolutely beyond criticism.

After careful cleansing of the lids, and irrigation of the conjunctival sac with boric acid solution, anesthetization was produced by three instillations of a single drop of 5% cocaine solution at five minute intervals. One drop of adrenalin solution (1/1000) was placed in the conjunctival sac a moment before inserting the speculum.

The operation was a simple implantation of the pterygium subconjunctivally below the cornea. The usual anchor suture of double threaded black silk held the growth in place and two small sutures of similar material closed the conjunctival wound. The whole procedure was as simple as usual, and occupied but a few moments. The patient was ideal in behavior and absolutely no untoward situation arose. A mild antiseptic ointment was placed between the lids and the eye dressed. The patient remained in the hospital resting quietly for a few hours and then returned to the home of her friend.

The following morning she appeared at my office for dressing with the statement that she had suffered all night with severe pain of a burning character in the region of the operated eye. Upon removing the dressing both lids were found to be intensely swollen and

red. The swelling extended toward the temple and there was tenderness of the preauricular gland. A very small amount of yellow secretion appeared on the lid margins. Upon separating the lids this extraordinary picture presented itself: The cornea was clear and bright but the region of the operative wound was transformed into an area of conjunctival slough 4 to 5 mm. wide, starting at the inner limbus and extending below the cornea almost half way around the eyeball. This slough was separated from the cornea by an area of conjunctiva 2 or 3 mm. in width, hyperemic but otherwise normal. The appearance of the phlegmon was in color much like that of a pharynx the third or fourth day after enucleation of a tonsil. (See Plate XI, Fig. 1.)

The sloughing area was cauterized with a 10% silver nitrate solution. The patient was immediately returned to the hospital and given continuous special nursing. The eye was irrigated hourly with a 1/10,000 bichlorid solution alternating with normal saline, followed by the instillation of 20% argyrol. Hot packs were applied to the lids and adjacent region and changed with frequency. Despite this and other vigorous treatment suggested by consultants, the condition advanced rapidly. The leucocyte count was 23,000, showing 91% polymorphonuclears.

The next day the phlegmon encompassed nearly two-thirds of the cornea while remaining about the same distance from it. (Fig. 2). In another twenty-four hours the limbus was entirely encircled altho the cornea itself remained unattacked. (Fig. 3).

In another forty-eight hours, however, accompanying a marked congestion of the narrow strip of conjunctiva lying between the phlegmon and the limbus, an annular corneal ulceration appeared, which, despite every attempt to delimit it, spread rapidly, covered superficially the entire surface and soon eroded the substantia cornea.

With the onset of the corneal ulcer there developed an iridocyclitis, and

soon, with a lens lying in the anterior chamber it was only too evident that the fight was lost, and the eye was enucleated 22 days after the pterygium operation. Careful search failed to reveal any orbital pus pockets.

The enucleated eye presented the following appearance: the cornea was entirely gone, the eye was shrunken and exceedingly soft. The sclera was greatly thickened at the limbus and there was no conjunctival tissue for a distance of 5 or 6 mm. back of the limbus. The vitreous appeared clear.

The day following enucleation the patient had severe attacks of vomiting with a pulse of 60 and a temperature of 99.6° to 100.6°. The lids and orbital tissue were intensely swollen and there was much purulent discharge from the orbit. There was no headache, pupillary disturbance or other symptom suggesting meningeal involvement.

The next day nausea and vomiting were less and by the third day had disappeared. The reaction of the orbital tissues was still tremendous and pus flowed in abundance from between the lids, gradually subsiding as the days went by.

A thorough systemic examination of the patient by a competent internist had been entirely negative. A Wassermann and urinalysis threw no light on the condition. The patient's personal history and that of her husband were good. The sinuses were clear. Repeated smears of the rather scanty purulent discharge from the sloughing area, examined at two different laboratories, showed no gonococcus and no pneumococcus. There was invariably present, however, a streptococcus and a staphylococcus, neither one abundant.

The following is the report of the pathologist: "A rabbit was injected intravenously with a mixed culture from broth from aerobic and anaerobic tubes. It was also injected intravenously with pus from the patient's eye with no results. The rabbit was observed for several weeks and posted. There were no joint lesions, no kid-

ney lesions and no endocarditis. A guinea pig was injected intraperitoneally on January 27, 1921, with pus from the patient's eye and on February 10, injected intraperitoneally with a mixed culture without results. It was observed for six weeks and posted. No gross or microscopic pathologic lesions were found."

Smears from the unaffected eye and from the nose failed to give these organisms.

With the hope of reproducing this condition experimentally my associate, Dr. Ira E. Gaston, made a conjunctival wound of the eye of a guinea pig, rubbing in the same mixed culture. In the other eye in a similar wound he inserted sutures of the same nature as those used in the patient's eye with view to the possibility of finding that the silk was at fault.

Neither eye showed more than the slightest reaction.

The origin of this infection is still unsolved. Careful analysis of every

step of the operating room procedure throws no light upon the problem. Immediately following this implantation and with exactly the same operating room technic, my associate and I did a corneo-scleral trephining. This patient showed absolutely no reaction and made a prompt recovery.

A study of the diet of the patient preceding the time of operation has been made, having in mind the possibility of absence of necessary food elements. These findings are negative.

The original area of slough suggested in appearance a trophic disturbance such as might follow the tying off of an artery or nerve supplying the region, were this conceivable.

One is forced to the conclusion that the unfortunate sequence resulted from (1) the implantation of ordinary pus bacteria of probably slight virulence and with low pathogenicity for animals, (2) traumatized ocular tissues of unusually low resistance.

GUNSHOT WOUNDS OF BRAIN WITH VISUAL FIELD DEFECTS.

G. E. BELLOWS, M.D.

KANSAS CITY, MO.

Three cases of the kind are here reported with discussion of the localization of such lesions. Read before the Colorado Congress, July 29, 1921.

It has long been known that the visual cortex, that portion of the cerebral cortex subserving the retinal function, is in the posterior portion of the occipital lobe, but it is only comparatively recently that it has been accurately delimited.

It is now definitely known to be restricted to the region of the calcarine

line with the French, and Axenfeld and Uhthoff with the German armies; and these seem to have put our knowledge of localization within the visual cortex on a fairly firm basis.

To determine what structures have been injured, the landmarks and procedure suggested by Holmes and Lister may be followed.

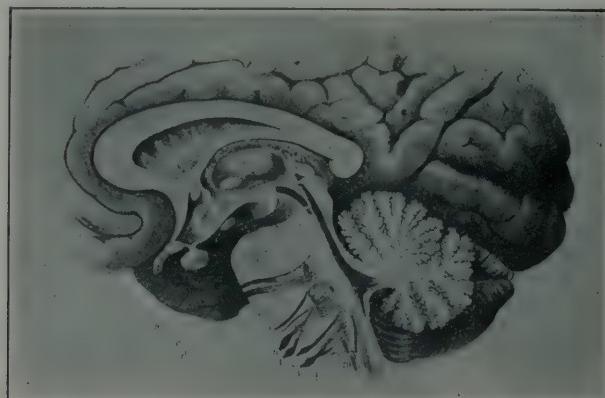


Fig. 1.—Median section of brain, showing a calcarine fissure and visual cortex of the occipital lobe.

fissure on the mesial surface, extending back to the tip of the lobe and probably a little onto the lateral surface. (Fig. 1). It corresponds accurately with the so-called "area striata" or region of Gennari's line, in which area the cortex differs histologically from the rest of the cerebral cortex. There has still been, however, some disagreement among investigators as to the location within this area of points corresponding to certain points in the retina.

During the world war a large number of cases of defect of the visual field resulting from gunshot wound of the brain came under observation, and many cases have been reported.

There is a substantial agreement in conclusion drawn by Holmes and Lister, with the British, Marie and Chate-

In a brain of average size the posterior end of the calcarine fissure is about $2\frac{1}{2}$ cm. above the inion, or posterior occipital protuberance, and extends forward horizontally about 6 cm. (Figs. 2 and 3). The visual cortex surrounding the fissure thus forms roughly a cylinder around this line as an axis.

The structures involved in gunshot injuries are determined by careful measurement of the wounds of entrance and exit, (in traversing wounds the path of the projectile is a straight line), by radiograms of missiles lodged in the brain, and by radiograms of depressed fractures in gutter wounds. In cases seen early, it may be difficult to distinguish the results of direct traumatism from symptoms due to concussion, hemorrhage, or edema,

more wide spread, but many of these cases were followed for months, and examined after all transient symptoms had disappeared.

ula and that this relationship is maintained for a considerable distance forward along the optic radiations.

I wish to report three cases of gun-

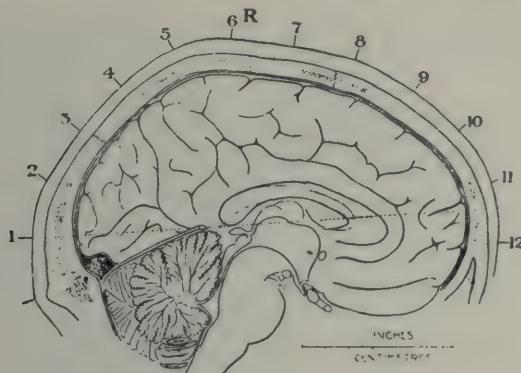


Fig. 2.—Diagram of mesial surface of cerebrum. Calcarine fissure and visual cortex opposite 1 and 2.

The conclusions drawn by Holmes and Lister (*Brain*, v. 39, June, 1916) which are in general agreement with those of a majority of writers, are:

1. That the upper and lower borders of the calcarine fissure correspond to

shot wound of the brain with visual field defects which came under my observation in the U. S. A. Base Hospital at Ft. Riley, Kansas, and in which the same method of study leads to similar conclusions.

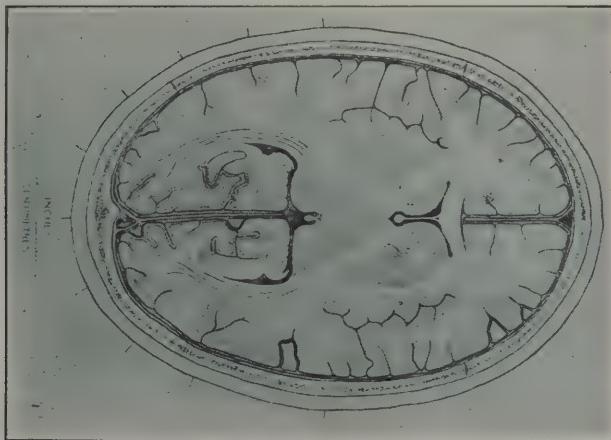


Fig. 3.—Horizontal section of cerebral hemispheres, showing optic radiations.

the upper and lower halves of the same side of the retina.

2. That the macula is represented in the extreme posterior tip of the area, perhaps extending a little onto the lateral surface.

3. That the visual cortex, from before backwards, represents the retina from the periphery inwards to the mac-

CASE 1. F. B., Pvt., 24 years, seen first July 7th, 1919. On Nov. 1st, 1918, while serving a M. G. on the Argonne front, was struck in the right occipitoparietal region by a fragment of H. E. shell. Did not become unconscious for about 3/4 hour. Helped dress the wounds of his companions and then fainted. Was unconscious about 3

days. Was operated upon at Mobile Hospital No. 44 on day of injury and portion of skull removed. Remained in Mobile Hospital 16 days and was

more than 4 months time that elapsed between the injury and the relief from suppuration.

The abscess, limited by the mem-



Fig. 4.

then evacuated to the rear and home, reaching General Hospital No. 11 at Cape May, March 7th, 1919. The wound had not then healed and he had a hernia cerebri. He was operated on

branes, did not pass beyond the median line.

I saw this patient on Dec. 19th, 1919 and the condition was unchanged.

CASE 2. V. H. Cpl. 27 years, first

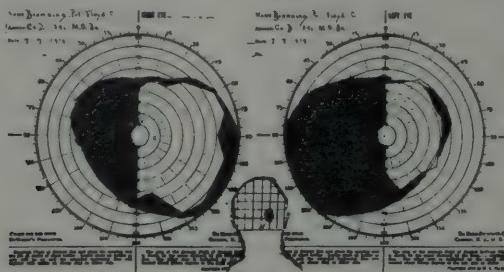


Fig. 5.—Fields of vision of Case 1, showing homonymous hemianopsia complete except around the fixation point. Diagram in middle indicates position of wound as seen from behind.

again April 10, 1919, and 3 small pieces of bone removed with the escape of considerable pus. (Fig. 4).

Prompt recovery followed with V. O. U. 20/15 and there is no impairment of motion or sensation.

This patient, as shown by his chart, had a left hemianopsia, complete except for about five degrees around the macula. (Fig. 5) Doubtless the entire right visual area was absorbed in the

seen Feb. 12th, 1919. On Oct. 12th, 1918 in the Argonne Forest, the soldier was struck in the right temple by a fragment of H. E. shell. He was unconscious for about 48 hours, and dazed for several days later.

Was sent to a base hospital where he was trephined over the right occiput and a quantity of pus drained from a cerebral abscess. Recovery was reasonably prompt but the soldier

could not see objects in the left field and could get about better at night than in day time. Could not read at all while in France but can read a little now.

About 1 1/2 disc diameters below disc is a group of pigmented patches in the retina, probably hemorrhagic.

The left disc is pale especially the temporal half. He was told in France

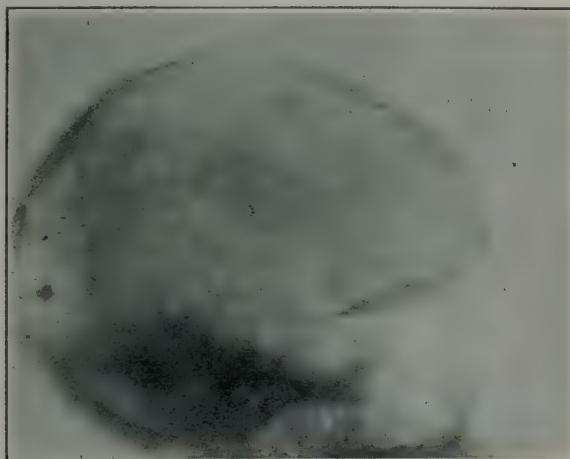


Fig. 6.—Radiogram of Case 2. Light area above shows point of entrance. Light area near occiput shows trephine opening and fragment of metal lying in the wound.

There is a scar 1/2 inch in diameter one inch above the middle of a line drawn from the outer angle of the right orbit to the auditory meatus.

The radiogram shows a cranial de-

that he had choked disc. This patient had a moderate general contraction of the fields and a marked quadrant defect—upper left. (Fig 7). The quadrant defect corresponds to the site of

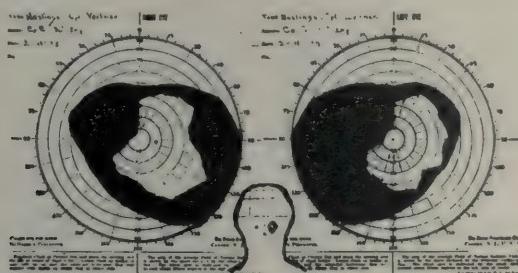


Fig. 7.—Fields of vision, Case 2. Upper left quadrant defect corresponds to cerebral abscess. Diagram in middle shows site of abscess as seen from behind.

fect at point of entrance, with small particles of bone and metal in the brain, a defect at the trephine opening in the right occiput, and a fragment of shell about one-half by one-half, by one-fourth inches, in left occipital lobe of brain. (Fig. 6).

V. O. U. 20/30, pupillary reactions all normal, refractive media clear.

Right disc paler than normal resembling beginning simple atrophy.

the cerebral abscess, on the right side below the level of the calcarine fissure, and the peripheral defect can be ascribed to damage to the anterior portion of the visual cortex or optic radiations during the passage of the shell fragment from the right temporal to the left occipital region. Hemorrhage into the retina was probably due to concussion, and the choked disc to the cerebral abscess.

CASE 3. J. G. Cpl. 20 years, first seen Jan. 13th, 1919. On Sept. 29th, 1918, on the Verdun front, the soldier was wounded by a machine gun bullet which entered the left parieto-occipital region, 1 1/2 inches above and behind the auditory meatus and came out at the same location on the right side. The bone was considerably shattered. He was unconscious six days during which time he was operated on and several pieces of bone removed.

tex is supplied in the main by the posterior cerebral artery, but that the macular region lies in the dividing line between the areas of the posterior and middle cerebral arteries. Necrosis or occlusion of the posterior cerebral artery would cause hemianopias; but if the middle cerebral were not affected, the posterior tip and the macular field would naturally escape.

2. Defects of the lower field from gunshot wound are much more com-

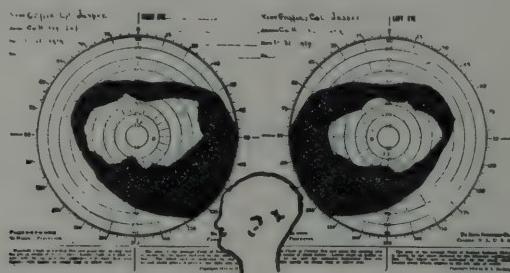


Fig. 8.—Fields of vision of Case 3. Diagram in middle, cross shows point of entrance of bullet, which cut optic radiations causing impairment of peripheral field.

I have not been able to obtain the radiogram in this case, but if we assume from the measurements given, that the projectile in traversing the brain injured the anterior portion of the visual cortex and the neighboring optic radiations, we should expect a defect in the peripheral field, and that is what is shown by the chart. (Fig. 8.)

The chief annoyance in this case is from the defect in the lower field which materially impairs the patient's walking and running.

These charts were all made on a McHardy perimeter, using a 10 mm. disc on a bright day.

Two or three interesting points may be noted in conclusion.

1. The frequent escape of the macular region in hemianopias due to disease of the occipital cortex, for a long time a puzzle to ophthalmologists and neurologists, is readily understood when we consider that the visual cor-

mon than those of the upper field,— This is plainly due to the fact that the lower portion of the visual cortex is in close proximity to the cerebellum and great sinuses, and wounds of this region are much more likely to be fatal —the upper quadrant defect in case 2 of this series was due to abscess formation and not to direct traumatism.

3. One thing which I only recently noticed, and I do not remember to have seen it mentioned elsewhere, is that in all these charts, the two fields are quite symmetric, but where there is any difference, the left is smaller.

It is my custom as a matter of routine to examine the right field first, and I believe the element of fatigue was the cause of the less prompt recognition of the moving object by the left eye. If the right and left eyes had been examined on separate days, I believe the fields would have been more nearly the same.

PERIPHERAL IRIDOTOMY (CURRAN) IN THE TREATMENT OF GLAUCOMA.

HAROLD GIFFORD, M.D., F.A.C.S.

OMAHA, NEBRASKA

An experience with this operation including thirty eyes forms the basis of this paper. The technic is described with modifications based on such experience. The theoretic basis for such an operation is discussed, with objections that may be urged to the theory. The paper was read at the Colorado Congress July 29, 1921, but a note embodying subsequent observations is added.

In the Archives of Ophthalmology, March, 1920, p. 131, and again in the Transactions of the Ophthalmic Section of the American Medical Association (1920 p. 75), E. J. Curran of Kansas City, presented a theory of certain forms of glaucoma, with a method of treatment, which in the opinion of the present writer constitutes one of the most important contributions to the subject since the time of von Graefe. His theory, in brief, is that in the majority of cases of quiet chronic glaucoma, and perhaps in acute cases also, the immediate cause of the increase of tension is an interference with the flow from the posterior to the anterior chamber, produced by a too close application of the lens to the posterior surface of the iris. He backs up his belief with approximately 94% of cures in 49 eyes, treated by producing a small hole in the root of the iris either by a peripheral iridectomy or preferably, and in the majority of cases, by a peripheral iridotomy.

In spite of the fact that the operation seems so simple (or perhaps on account of this) and the results so surprisingly good, the papers have hitherto met with practically no recognition; and this, in the present writer's opinion is largely due to the theoretic difficulties which at once arise in the mind, in attempting to reconcile Curran's theories and facts with what we have previously known or believed about glaucoma. These theoretic objections, which Curran does not take the trouble to explain away, seem so important, that in spite of the author's evident sincerity, I am bound to say that at first I took no particular stock in his procedure; and I find that this is the mental attitude of every one with

whom I have talked about it. It was only after seeing, in his clinic, the immediate and wonderful effects which Curran produced by simply cutting a little hole in the iris-root, that I became convinced of its importance.

Since November 15th, 1920, my colleague, Dr. Jas. M. Patton, and I have operated on 30 eyes, in 23 patients, by the Curran method and the results have been so satisfactory that I feel like endorsing Curran's claims without qualification. Twenty-two of these eyes were of the kind which Curran insists are the ones most certainly suited to the operation; that is, they were quiet, distinctly glaucomatous eyes, with tension ranging from 32 to 70 (Schiötz) in which the iris could be distinctly seen to be pushed forward to some extent by the lens. In 17 of these, an apparent cure was effected. That is, the tension dropped to below 23 and remained there with sight and fields as good or better than before the operation. In 4 of these the result was only moderate, the tension going down from 37, 47, 32 and 40 respectively, to 27 in all four. In each of these four eyes the hole in the iris root was very small. Better technic would undoubtedly have given better results. In one of the 22 the result in a practically blind eye was distinctly poor; tension dropping from 44 only to 35, the general condition becoming poorer than at first, on account of severe hemorrhage into the anterior chamber. In 8 eyes in which the iris was not pushed forward at all, the results of the puncture were practically negative or transitory; in 2 of these an Elliot trephining later produced a satisfactory result.

The length of time which has elapsed since the successful operations were

done is, of course, not great; but in the majority, at least 3 months have elapsed without any tendency to a recurrence of increased tension. I have had no experience with peripheral iridotomy in *acute glaucoma*, but Curran has tried it with good results in several acute cases.

OPERATIVE TECHNIC

Curran's description of the technic is literally as follows: "The knife [Knapp's knife needle] was passed thru at the corneo-scleral junction.

pate any difficulty in performing the operation. Practically, however, I find that while therapeutic results are fairly uniform it is very difficult to obtain the same uniformity in the operative results. It is by no means easy nor even possible in all cases, to cut thru the little bridge of iris picked up by the point of the knife; and I have had to be satisfied in a number of cases with two very small holes or even only one. Luckily, however, in the great majority of cases a minute hole seems to do as well as a large one. But this is not

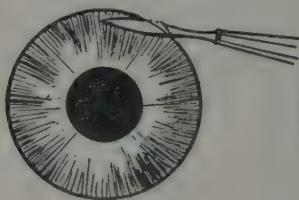


Fig. 1.

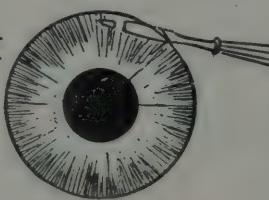


Fig. 2.
Curran's operation of iridotomy.

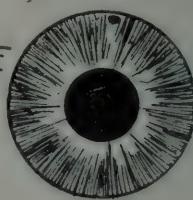


Fig. 3.

Fig. 1.—Knife needle entering anterior chamber at corneal margin.
Fig. 2.—Knife needle after puncture and counterpuncture of iris.
Fig. 3.—Hole in iris made by cutting out a fold on needle.

[Fig. 1]. The iris was engaged by the point of the knife, which on further pushing formed a little ruck in the iris, rendering the easy performance of the counterpuncture. The knife was pushed still farther with pressure directed upward, so as to cut the iris transversely, making a hole about 1 mm. in size. Sometimes it was necessary to almost make a counterpuncture in the cornea in order to sever the intervening piece of iris. At times it was found that the first puncture made a hole in the iris sufficiently large and the knife was withdrawn without a counterpuncture in the iris. In cases of long standing, in which there might be an occlusion of the canal of Schlemm, the knife was directed toward the ligamentum pectinatum of the opposite side so that some of these would be cut by the point of the knife with the hope that free drainage into the canal of Schlemm would thus take place."

From the brevity and simplicity of this description one would not anticipi-

always the case. Where the hole is very small a second operation is more apt to be required; and was required in 5 of the successful cases; and even where the tension remains normal, with a small hole the operator feels less assurance about letting the patient pass from observation, than if the hole is one that can be easily seen.

The reading of Curran's case reports makes it clear that he has met some of these difficulties, and I consider it unfortunate that he has given them so little attention. I believe, therefore, that a page from my own experience may be of use to others. In the first place I could see no reason, from Curran's description, why the bridge of iris should be severed by cutting up, rather than down; and on asking Curran about this his only explanation was that he thought there was less danger of injuring the lens if the cut were made upward. This reason did not seem good to me, so I tried in my first two cases, to cut down; but found that the iris was so elastic that the peri-

phery could be drawn clear down to the center without cutting thru the bridge.

As I could not see how cutting up with a play of only 1 mm. could possibly give a better chance of cutting the bridge, than cutting down with a play of several mm. my enthusiasm for the operation faded rapidly and might have disappeared entirely if it had not been for the suggestion of Dr. Patton, who, after a special trip to Curran's clinic, returned convinced that, generally, where Curran got a complete division of the iris bridge, he did so by pressing the latter against the corneal tissue with the edge of the knife. After this we succeeded in making the proper union of the puncture and counterpuncture in a fair proportion of cases, but by no means always. In his description it may be noted that Curran speaks of being obliged almost to make a counterpuncture in the cornea in order to cut the bridge. It was in thus making a deep counterpuncture that I got the only bad result in my series, on account of the severe hemorrhage above described (See also p. 894).

My impression now is that to be as sure as possible of an ideal result, one should have a Knapp knife needle (not a Ziegler), with a very sharp point and edge, with something of a belly and a blade not longer than 5 1/2 mm. If with this, after making the puncture and counterpuncture in the iris, one will press the blade upward firmly but very slowly against the cornea or sclero-corneal junction, the result is apt to be good. The needle should be introduced subconjunctivally and withdrawn slowly.

FIXATION AND ANESTHESIA. I find that fixation by the superior rectus tendon (if the cut is to be upward) is better than a fixation at any other one point. The ideal fixation would be a double one, by a lateral rectus tendon for the puncture and by a vertical tendon for the vertical movement of the knife. The objection to using double fixation is that it demands more liberal use of the anesthetic; and economy in this direc-

tion is of great importance, because the difficulty of the operation increases with the dilatation of the pupil. To avoid this it is important to give a drop of 1/2% eserin every minute or so, five times before and during the preparation; and to limit the use of cocaine to injecting 3-4 drops of 1% solution, 5/16 to 1/2 inch away from the corneal margin. In addition to this we use a drop of 2% alypin solution (as suggested by my assistant Dr. Nora Fairchild) applied four times to the conjunctiva and cornea before the four minutes thru which the cocaine injection is allowed to act. Where alypin can not be obtained, its place is best taken by a single drop of 2% cocaine followed by three drops of a 2% holocain solution. It is always well, as in a cataract operation, to have the patient come to the table with an empty stomach, so that a general anesthetic can be given if he prove to be unruly. A right handed operator naturally makes the hole in the left eye, above; on the right eye also, the hole can be made above, working across the nose bridge in most patients; but with a high bridge, unless the operator be thoroughly ambidextrous, it is better for the right eye, to stand at the head and make the opening below. The reason for standing below, when the iris is to be cut above, is that this enables the operator to see the point of the knife when it passes up under the limbus. When a second iridotomy must be made on an eye, it should be made at the side opposite to the first hole. When any considerable congestion follows the operation, homatropin or even atropin should be used cautiously to prevent adhesions. As Curran insists, it is very important to get the opening as far as possible toward the periphery so that it will not be closed by coming into contact with the surface of the lens. This was well shown in one of my cases in which at the first operation a perfectly good hole was made in the iris, but it was at least 1 1/2 mm. from the periphery; and altho it reduced the tension from 40 to 27 the patient continued to have occasional spells of blurring such as she

had had before the operation. A second iridotomy made only a very minute hole in the iris, but it was well out in the periphery and the blurring has not recurred since it was made, and the tension has remained at about 22.

THEORETIC OBJECTIONS

The objections to Curran's theory and practice which most readily come to mind are these.

1st. If glaucoma is due to resistance to the current from the posterior to the anterior chambers, offered by an abnormal extent or firmness of contact between the iris and the lens, why does not *iris bombé* occur?

2nd. How shall we account for the tension reducing action of myotics, which must increase the extent and firmness of the lens-iris contact?

3rd. Why does not an iridectomy which, when the iris is torn loose at the root, gives the freest kind of communication between the chambers, produce as good results as the iridotomy?

In answer to 1, it may be said that we practically never see *iris bombé* except when the adhesions between the lens and iris are confined to a comparatively small circle near the center. Where there are peripheral adhesions, there is not enough slack left to permit bulging at the periphery. In chronic glaucoma, to be sure, there are no adhesions between the iris and the lens, but the latter is pushed forward by the increased pressure in the vitreous; and that the contact thus produced with the iris is firm enough to cause an overaccumulation behind the root of the latter, can be demonstrated to a certainty by the increased depth of the anterior chamber which can be seen to develop within half an hour, after a successful iridotomy with little or no loss of aqueous.

With regard to the action of myotics, which decrease the tension while increasing the iris-lens contact; I do not believe that this can be explained on the supposition of a direct filtration of aqueous thru the iris root, as Curran has suggested in a verbal communication. No sufficient proof has ever been offered that this takes place, and our

common experience with *iris bombé* argues strongly against it. It seems more rational to assume that while the myotic tends to raise the tension by increased iris-lens contact, this is more than overcome by its effect in freeing the entrance to Fontana's spaces.

The third objection is the most difficult to meet. A well performed iridectomy certainly opens up a free communication between the chambers; and in the light of Curran's work it seems probable that in the numerous cases in which it relieves tension without a filtering scar, this communication is what does the work. Why then, if Curran is right, is iridectomy so notoriously inefficient in chronic cases? And why should a simple peripheral iridotomy or peripheral iridectomy be so strikingly superior in its effects? It seems to me the answer to this objection is that while an iridectomy re-establishes the free communication between the chambers, this communication is too free to produce an essential part of the effect of an iridotomy, namely, the pushing back of the iris-lens system into its proper position, thus freeing the entrance to the spaces of Fontana. After an ordinary iridectomy, the fluid passes without resistance from the posterior to the anterior chamber; but the opening is so free that there is no tendency for the iris to be pushed back. When, on the contrary, a peripheral iridotomy or iridectomy is done, leaving the sphincter and the main portion of the iris intact, the fluid which passes forward thru the peripheral hole pushes the iris back to a depth corresponding to the inflow, until equilibrium is established.

Curran relates one case where after an unsuccessful ordinary iridectomy, he got a permanent reduction of tension by an iridotomy at the opposite side. To explain such a result on Curran's theory, one has to suppose that the space between the iris periphery and the zonula is not always continuous all the way around; and that this may be so is indicated by the occasional case in which a partial *iris bombé* occurs.

It will be noted that the results of a peripheral iridotomy in glaucoma offer the most convincing proof of the incorrectness of Hamburger's idea that there is, generally, a lack of communication between the posterior and anterior chambers, and that the passage of liquid forward from the posterior chamber if it occurs at all, is so insignificant as to be of no consequence.

If this explanation is correct, it shows, together with the favorable effects of miotics, that it is not merely the opening of the communication between the chambers that produces the good results which follow iridotomy, but that the opening of Fontana's spaces is also necessary for the best results. When a successful trephining has been done, the effect on the tension may in part be due to this action of the peripheral iridectomy. But so many trephined eyes remain soft in spite of a continued shallow chamber, it is evident that, with good scleral drainage, the reposition of the iris (i.e., the pushing back of iris and lens) is not essential.

Curran seeks to explain the pushing forward of the lens, in the majority of glaucoma cases, by the supposition that the aqueous secreted in the posterior chamber, meeting with the abnormal resistance to its passage into the anterior chamber, forces its way thru the zonula into the vitreous and thus tends to push the lens forward. This supposition appears to me to be erroneous. Since the normal flow is from the vitreous to the posterior chamber as I demonstrated in rabbits 30 years ago (Arch. of Oph. XXI, 179, 186), it seems much more likely that the first step in the process is the occurrence of rather sudden accesses of pressure in the vitreous, which push forward the lens, before the pressure can be equalized by passage of fluid thru the zonula. Then the resistance to passage thru the pupil offered by the increased iris-lens contact leads to the permanent increase of intraocular pressure.

COMMENT.

To grasp the force of the argument that lens-iris contact plays a large part

in many cases of glaucoma, the reader should bear in mind the incontrovertible fact that where a patient with chronic glaucoma and a shallow chamber has a hole of about 1 mm. in diameter made in the periphery of the iris, *with little or no loss of aqueous*, the chamber can plainly be seen to be deeper in the course of half an hour; and the tension, while it may not fall, or may even be higher for a few hours or longer, almost invariably falls to normal in the course of 24-48 hours. If, on the other hand, the chamber be not at all shallow before the operation, in quite a large proportion of cases the fall of tension either does not take place or it is not permanent.

It will naturally take a good deal more time to determine how permanent the results of peripheral iridotomy will be; but even if they do not hold out as well as those obtained by the Lagrange or Elliot operations, there is no doubt in my mind that Curran is amply justified in his claim that even if we could know that a case would eventually need a filtering operation, in some cases the iridotomy would be worth while to reduce the danger of the more serious operation; and where the patient has good sight, but a field limit close to the center, I believe the trial of the iridotomy should be mandatory. The same is true where a strong tendency to ocular hemorrhage has been observed either as the result of operations or by the presence of hemorrhages in the retina. I have had one case in which one eye with retinal hemorrhage was lost from intraocular hemorrhage, setting in several days after a perfectly faultless trephining, where only the direst necessity could compel me to open the other eye freely. In this case (and in a similar one of Dr. Patton's), the peripheral iridotomy has held the tension nearly down to normal; and it should, I believe, be repeated indefinitely if necessary, rather than risk the danger of scleral drainage.

The fact, demonstrated by Curran, that in many of these iridotomized eyes atropin can be used freely is another of the interesting things for which the

reader should consult his original papers but which this paper can not take time to discuss.

CONCLUSIONS.

(1) The results of peripheral iridotomy prove conclusively that in a large proportion of cases of chronic glaucoma; and probably of the acute form also, abnormal iris-lens contact plays an important part.

(2) Nearly all, if not all cases of chronic glaucoma with shallowing of the anterior chamber, can be relieved for many months and probably indefinitely, by making one or two holes about 1 mm. in diameter close to the root of the iris.

(3) The experience of Curran indicates that acute glaucoma, or exacerbations of the chronic form, can also be cured by the same operation.

(4) Where the chamber is deep, the effects of peripheral iridotomy are apt to be negative or not permanent.

(5) Even if the results of the puncture prove to be not permanent, it is so simple that it can be repeated often, with very little strain or danger; and as a preparation for more serious operations it is sure to have a place.

(6) If the favorable results of the operation prove to be permanent, peripheral iridotomy, or some modification acting on the same principle, is destined to displace ordinary iridectomy and the filtering operations from a large part of the field which they now occupy.

(7) The peripheral iridotomy, as proposed by Curran, while very simple and satisfactory in many cases, is by no means easy, nor even possible nor safe to perform in all cases. The substitution of some less simple but more reliable method of making a hole thru the iris periphery, may eventually turn out to be more practical.

[Since the above was written and read, I have had a second bad result from a peripheral iridotomy or an attempt at it. The patient, a woman with only one eye, seemed to be an ideal subject for the operation; but the counterpuncture in the iris could not be made without pushing the knife rather

deeply into the tissues at the angle of the chamber. A sharp hemorrhage into the chamber followed, with quite a severe congestive reaction. The tension was reduced from 32 to 25, but the pupil became adherent and the sight was much reduced. In this case the bridge of iris was not cut thru. I think it probable that the sight will improve considerably. But the case is a sharp reminder that it is not safe to say that the operation can do no harm. It also emphasizes the question whether some other method of making a hole in the iris root, less apparently simple, but capable of greater uniformity in results, may not with advantage be substituted for Curran's iridotomy.

Where everything goes according to schedule, this operation is the simplest and most satisfactory thing imaginable; the knife transfixes the fold of iris and on cutting up and a little forward against the cornea, a nice hole is made; but in other cases, for no apparent reason, the same knife needle will puncture the iris but will fail to make a counterpuncture; either entirely, or until the point is pushed so far up and across that one cannot see just what it is doing. My two bad results have occurred when, in cases of this sort, I have attempted to be sure of cutting thru. Unless Dr. Curran has some new light to cast, I feel like advising that where the counterpuncture in the iris is not readily and evidently made, it is best to give up the attempt to make it and to cut slowly and not deeply against the cornea after the simple puncture of the iris. Whether this procedure will prove to be safe and efficient remains to be seen. If not, it may well be that a puncture, counterpuncture and complete section of iris periphery and limbus with a very narrow cataract knife; or a return to the peripheral iridectomy which Curran tried in his earlier cases, will in the long run be better suited for general practice. The more I see of the operation, the more I am convinced that a knife with a *very sharp* point and edge is the most important factor in its successful performance.

THE PRESENT STATUS OF KERATOPLASTY.

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The different operations proposed for keratoplasty are here grouped into four types. These are described and a summary given of their results. A case is reported in which the suggestion of Kraupa of rotation of a trephined flap was used. A bibliography is appended. Read before the Wisconsin Surgical Association, May, 1921.

The removal of opaque or translucent corneal tissue, with its consequent impairment of vision and the substitution therefor of clear corneal tissue, has been attempted from time immemorial by ophthalmic operators, each with slight variations in technic. A detailed account of these various attempts, both clinical and experimental, would be most tiresome; and for a com-

smoothly as possible. To fill in the denuded area, a disc of equal size was trephined from an animal's eye (dog or rabbit) or from a human eye that was to be sacrificed for some other reason. But the disc, to be implanted, embraced the entire thickness of the cornea. It was laid in place in the denuded area, care being taken to see that

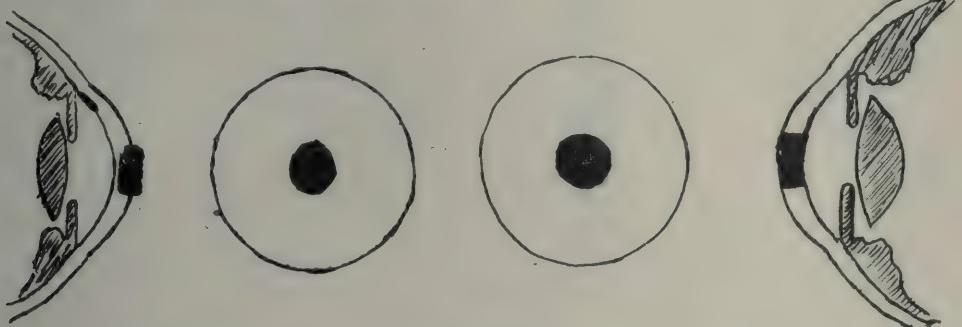


Fig. 1.—Von Hippel lamellar type of keratoplasty, showing position of implant seen in section and from the front.

Fig. 2.—Von Hippel complete disc type of keratoplasty, replacing whole thickness of cornea.

plete bibliography of the subject, the reader is referred to Czermak, Elschnig and Wiener for communications up to 1909, and to Ascher and Walker for subsequent articles.

Of the different forms of operative technic, four types have yielded the highest percentage of good results:

I. The first type of operation was proposed by von Hippel in 1888, and up to as late as 1910 was the only keratoplasty that had yielded a permanent satisfactory result, altho a slight modification by Mühlbauer was equally successful. Von Hippel trephined an area of the opaque cornea some three to four millimeters in diameter to a depth of about half the thickness of the cornea. For this, he used the von Hippel trephine with a guard to prevent perforation. The disc, thus outlined, was then dissected out as

the epithelial side was uppermost. The lid was gently lifted into position and the eye filled with some sterile ointment and bandaged. Suturing the disc in place was distinctly contraindicated. A few satisfactory results were reported. But these were the exception rather than the rule, to a procedure that was tried very extensively, and eventually this method gave way to the second type.

II. The complete disc keratoplasty was also conceived by von Hippel and, to a great extent, has superseded the earlier operation. With the same trephine, a disc of thru and thru corneal tissue is cut from the receiving eye, the guard being used merely to prevent too rapid a perforation with subsequent possible damage to the iris or lens. Absolute fixation of the eye ball is necessary, and the Elschnig bridle suture

thru the tendon of the superior rectus has proven useful for this purpose. If the iris is adherent to the posterior surface of the cornea, it must be dissected free. An identical disc is cut from the donating eye and gently laid into the aperture prepared for it. Here, too, great care must be exercised in preventing an inversion of the disc. No sutures are necessary, as the disc becomes fixed in place in a very few minutes by a plastic exudate. The eye is filled with a sterile ointment and the

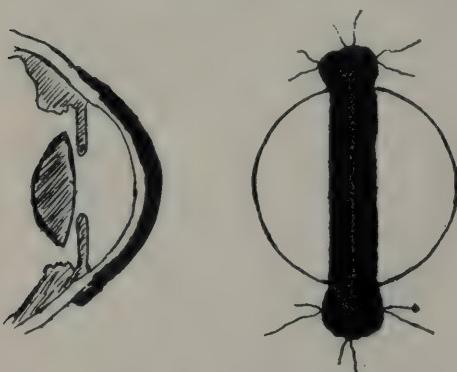


Fig. 3.—Loehlein ribbon lamellar type of keratoplasty. Stitches placed at each end of ribbon.

lids lifted gently into place. A firm binocular bandage is applied and allowed to remain for 48 hours, and then renewed every other day for two weeks. During this time, it is essential that the patient remain quietly in bed. It is of course unnecessary to add that absolute sterility of the conjunctival sacs of both donor and receptor must be assured by repeated cultures. The donor may be an animal, but better results follow the use of a homogeneous implant.

The earlier results of this method were not perfectly satisfactory, but perfection of the technic by Elschnig has improved the ultimate outcome. This author has recently reported fifty-four cases operated, with absolutely clear implants in seven cases. Nearly all of these cases were observed for upward of twelve months and some as high as six years. No other method has ever yielded results at all comparable with these, either in percentage of

increased vision or in length of time that the implant has remained clear. In eleven cases, the implanted disc sloughed out within a few weeks, and the aperture was filled in with scar tissue so that the patients were but little worse off than before operation. In the remainder of the cases, the implant became cloudy and the final vision showed no improvement. One eye was lost by panophthalmitis, and in several cases there was either a slight vitreous loss or a small iris prolapse that required excision. Blood matching of the donor and receptor did not increase the percentage of good results, nor did the original condition of either eye seem to have any marked influence upon the progress. In one case of a man of 29 years, the cornea was opaque from scars following a severe interstitial keratitis, and the vision of that eye corrected was but 2/60. A complete disc keratoplasty was performed. Nearly two years later, the disc was perfectly transparent and the corrected vision was 6/6 full.

III. In 1909, Löhlein published a partial keratoplasty, the technic of which he had perfected upon rabbits and which is a typical operation of the third class. A vertical ribbon, some three to four millimeters wide, is excised from the center of the cornea by means of a knife with two parallel rigid blades that distance apart. The depth of this strip is about half the thickness of the cornea; and at each end, a conjunctival flap in the form of a fan remains attached. One of the conjunctival flaps is raised with a blunt forceps and the cornea gently dissected free. A similar ribbon of cornea and adherent conjunctiva has been prepared from the eye of the donor and is immediately laid in the place of the excised corneal strip. Three sutures in each conjunctival fan serve to fix the graft in place and maintain it there until nutrition is established. A few favorable results have been reported, but far less than from operations of the second type. Of course, this type of operation is suitable only for superficial scars and here as well as in the other operations, absolute sterility of the tissues in-

volved must be assured by repeated cultures.

IV. The fourth successful type is represented by Wiener's denuding operation and is limited in its application to very superficial scars. An area, one third larger than the area of scar tissue, is outlined with a very sharp knife to a depth of about one half of the thickness of the cornea. One corner of this area is raised and grasped with forceps; and, with a fine pointed knife, the epithelium and superficial corneal tissue is peeled off, much as the skin of an onion is peeled off. A great deal of the success of the operation consists in remaining in the same corneal stratum throughout the peeling-process; and this is accomplished by blunt dissection along the white line that appears at the junction of the cornea that is already free with the cornea still in place. After the tissue has been removed, the eye is filled with sterile ointment and bandaged, and regeneration of the denuded area allowed to take place. If nutrition has not been too badly interfered with, the regenerating cornea should remain transparent.

Of course, innumerable other types of operation have been attempted, and individual successes have been reported by many of the originators of the technic. But no one of these various types have proven efficacious in the hands of other operators. Among these may be mentioned the total keratoplasty suggested by Burke but a few months ago, altho the same operation was described by Wagenmann as long ago as 1888. Walker proposed a modification of Löhlein's lamellar operation, altho this same type was abandoned by Elschnig, following several disquieting failures. Even more radical than all was Szimanowski, who proposed a transplantation of the entire cornea with adherent sclera and conjunctiva and in case of necessity, the entire iris.

CAUSES OF FAILURE.

The lack of success in any keratoplasty is due to: 1, suppuration; 2, failure of the implant to adhere, or 3, subsequent opacity of the implant.

In nearly all cases, suppuration may be avoided by scrupulous technic. As the operation is never an emergency operation, sterility of the conjunctival sac, with associated sterility of the cornea, may be assured by repeated cultures following the methods laid down by Elschnig and Ulbrich. In this connection, emphasis should be laid upon the unreliability of smears from the conjunctival sac where the organisms may be but few. A smear is usually made with a platinum loop

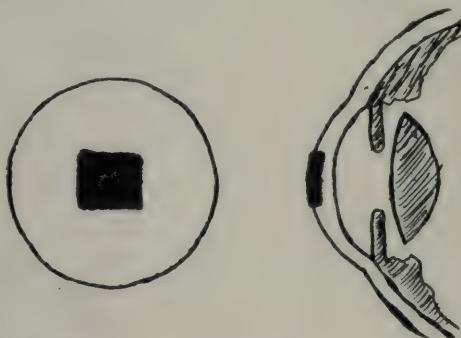


Fig. 4.—Wiener denuding type of keratoplasty shown from the front and in section.

which can gather merely the organisms on the surface with which it comes into contact, whereas a proper culture is made by flooding the conjunctival sac with fluid culture media, which is then taken up with a pipette and introduced into the culture tube. This method gathers the organisms that are lurking in the retrotarsal folds and shows the presence of organisms in about double the number of cases that a smear alone does. Under no circumstances should a keratoplasty be attempted until the conjunctival sac of the receptor at least, and preferably the donor as well, is assured free from contamination.

Failure of the implant to adhere dooms the ultimate success of the operation in a small number of cases, possibly 15%. The cause of such failure is not known, nor can it be foretold in advance. Ascher and Elschnig conducted an extensive series of experiments to determine whether a serologic cause could be found, but were not successful. Blood matching of donor and receptor gave no basis for

prognosis. An analysis of the causes of the corneal opacities removed, yielded nothing. Preservation of the graft to be implanted for minutes, hours, days, and even months (Magitot kept one graft for four months before utilizing it) seemed to have no influence upon the course of the case. All that can be said is that in a certain number of cases of all types of keratoplasty, the graft sloughs out, or rather fails to adhere, and is removed by the passage of the lids. This leaves an open area that slowly fills in with scar tissue, impermeable to useful light rays; and the patient is but little worse off than before the keratoplasty was attempted.

The implant may become opaque within twenty-four hours after the operation. This is due to swelling of the corneal stroma from the presence of aqueous that has gained admission to the implant by damage of the endothelium or by rough treatment of the implant itself, such as crushing with forceps, etc. If the trauma has not been too severe, such opacity clears to a certain extent and does not vitiate the value of the graft entirely. Secondly, the implant may become opaque within several days following the operation, due to the ingrowth of new vessels from the edges. Such new vessels are apt to be very fine and numerous and are surrounded by a definite zone of opaque tissue. Such opacity seldom disappears, but usually it is not so dense as to eliminate qualitative vision entirely, altho there is a marked reduction. The third type of opacity appears several weeks after operation and is permanent. It is probably due to failure of nutrition of the graft, owing to a walling off process that occurs in the cornea adjacent to the operated area. No serologic cause has ever been found for that process. Finally a fourth type of opacity may appear, years after the operation has been called a success. This is frequently in conjunction with an increased intraocular tension and usually results in the complete loss of qualitative vision.

In 1914, Kraupa made a purely theoretic suggestion for partial keratoplasty; but as far as can be ascertained,

the operation was never performed. This operation was suggested for a superficial opacity, lying in the pupillary area of the cornea, the periphery of the cornea being clear. It was suggested that with a large von Hippel trephine, an area of the cornea be outlined, eccentric to the pupillary area of the cornea. This would bring the opacity near the periphery of the outlined disc, which was to be dissected free and rotated upon its own axis, so that the opacity would eventually lie without the pupillary area of the cornea and the former site of the opacity would be covered by the opposite periphery of the disc, containing clear cornea. The idea appeared so ingenious that I attempted the operation in the following case:

Mrs. G. S. Age 50. When first seen in 1918, corneal opacities were found which were supposed to have been present some four or five years. The right pupil was 2 mm. and the left 4 mm. and both immobile. She was receiving antispecific treatment at the time. Vision then, right 6/60 and left 6/22. This examination and record were made by the late Dr. M. Frank.

In October, 1919, each cornea showed a rather dense superficial opacity over the pupillary area, the right somewhat deeper than the left, but the left more extensive than the right. The right pupil was 2 mm. and the left 4 mm., both round and even, but immobile. The view of the fundi was impaired, but no pathology could be seen in the back-ground. The tension was normal. Wasserman was + +. Right vision was 0.2 ? and the left vision 0.3. The right vision could not be improved with glasses; the left was improved with a minus sphere and cylinder to 0.4. Under local anesthesia, a 6 mm. disc of the right cornea was outlined with the von Hippel trephine, eccentric to the pupillary area of the cornea. It extended thru about one-third of the thickness of the entire cornea. With a spatula and a keratome, the disc was dissected free and rotated upon its own axis without being lifted from the corneal bed. After determining that the margins were in place the eye was

filled with yellow oxid ointment and tightly bandaged.

Eleven days later, the eye was completely free from signs of irritation and the disc was well healed in place. The outlines were clearly visible. The new pupillary area of the cornea was fairly clear but not entirely so, as there was some deeper opacity that had not been included in the disc.

Five months later, the entire disc was slightly hazy, but distinctly clearer than the original opacity. The outlines of the incision were still visible as a faint grey ring well under Bowman's membrane. The corrected vision was now 0.3 full.

One year and five months after the operation, the eye was pale and not irritable. With the naked eye, the location of the disc could be barely determined by the faint haziness of that portion of the cornea, but the outlines were no longer visible. The central opacity that lay below the disc was unchanged. Under the slit lamp, the opacity of the disc was found to lie immediately below Bowman's membrane and consisted of a diffuse lattice-like opacity or rather haziness of the corneal fibres. No new vessels could

be seen. The outlines of the disc could be determined indefinitely, but there was no sharp line of demarcation. The remainder of the cornea was normal. The pupil was contracted to one and a half millimeters and was rigid, precluding a clear view of the fundus. The corrected vision of the eye was 0.2 full. The left eye was unchanged except that the corrected vision had fallen to 0.3 full.

Theoretically, this operation must be considered as at least a partial success. The corneal transplant remained sufficiently clear to permit of qualitative vision, which is the point desired of such an operation. Unfortunately, not enough corneal depth was included in the trephined disc to embrace the total opacity, an error which can be eliminated in future operations by a proper depth estimation of the opacity by aid of the slit lamp. The failure to improve vision was due to two factors; the deeper opacity which has just been discussed; and a gradually advancing tabetic atrophy of the optic nerve. But the operation was sufficiently successful to warrant the use of this technic in other and more favorable cases.

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MATURE AND IMMATURE SENILE CATARACT.

LT.-COL. HENRY SMITH; C. I. E., I. M. S.

AMRITSAR, INDIA.

The following address, delivered before the Chicago Ophthalmological Society, May 26, 1921, gives some history of intracapsular extraction. It compares the intracapsular with the capsulotomy method both as to technic and results.

I propose to speak to you on the relative merits of the two leading methods of dealing with senile cataract, mature and immature. This, I presume, we all regard as the great issue of today in ophthalmology. That it is a burning issue is clear from the vehemence that is displayed in the ophthalmologic press. Quotations are oftentimes gathered from men who have little or no practical experience with this intensely practical subject, even tho they have written books and have honored names in other departments; and on the strength of such quotations is used such language as "extraction of cataract in the capsule under conditions existent in a civilized country is utterly inexcusable." "The capsulotomy schools do not all use quite as strong language as this. Another writer lays down the dictum on this subject that the literature on a matter of this kind is always favorable to anything new. Does any one really hold that the intracapsular operation has been received in this way? Does any one hold that Listerism was received with open arms when it was new? Does any one hold that Litholapaxy when introduced by Freyer and Keegan using the instrument devised by your own great citizen surgeon (Bigelow) was received favorably by the genitourinary surgeons of the world? No! These and all similar innovations on time honored practice have been received with the utmost hostility.

The capsulotomy operation of today is practically where Daviel left it. Details have come into existence and gone out of existence with all the frequency and ease which befall philosophic theories. All the same, Daviel's operation is substantially the capsulotomy operation of to-day. A new detail does not make a new operation. We are told that Daviel's operation has

held the field since 1745. Its advocates should state that, while it came into existence in 1745, it was not practiced to any extent until Joseph Lister had established his case, and that extraction by capsulotomy in a general sense commenced to supplant lens couching only in the early eighties. The late Sir Jonathan Hutchinson, (who founded Moorfields in London), told me that they would never have departed from couching in London, but for the fact that the vision (following couching) rapidly failed, and finally vanished. He was the first man I have come across, who was aware that progressive atrophy of the retina invariably followed the best results of lens couching (night blindness). It was Listerism and cocaine which gave the great impetus to the extraction of cataract.

The younger members of the profession have to be reminded that the capsulotomy operation, as we know it, has been extensively practiced only for the past forty years. You will thus see that of these two rival operations the capsulotomy operation is not so very much older than the intracapsular as we do it in India to-day, which dates from the nineties of the last century.

The capsulotomy operation had however a good start as soon as it was practiced extensively, as it had been taught and had been before the professional mind from 1745 as a desideratum. The intracapsular method, since I commenced to advocate it and to teach it, is hardly twenty years old. I do not claim to be the first man to do intracapsular extractions. McNamara, in Calcutta, and Pagenstecher extracted cataract in the capsule by lifting it out on a spoon. I think the first to extract cataract in the capsule by expression, in a limited proportion of

cases, was an American, Dr. J. W. Wright, of Ohio, who published a paper in 1884. Shortly after this Malroney did practically the same operation on almost all his cases. It is a pity that Wright's work did not attract more attention even in his own country. Malroney did a vast amount of excellent work, but did not write at all; and thus his experience is lost to the ophthalmologic world. I have never seen him operate. Neither McNamara's nor Pagenstecher's method appealed to me. Wright was unknown to me. Malroney's results I had seen but not his methods. I also saw that patients could on occasion squeeze out the lens in capsule successfully themselves. The results of the patients' efforts were excellent. I proceeded to imitate the accident and evolved what I have done independently of any one. This method may yet be only in its infancy but it promises to be a hardy youth.

We are told that we are received unduly favorably. This is not so. When I read my first paper, at the British Medical Association meeting, in 1903, on an experience of 6,000 cases, I was received with icy coldness. I was at the head of a list for a paper before the British Medical Association, in 1908. There were 6 or 7 unimportant papers to follow. At the commencement of the sitting the President said, "I shall reverse the orders of the papers," which left my paper to be taken as read. This was surely not unduly friendly to say the least! However, I have not always been treated with such scanty courtesy.

Dr. Herman Knapp is a name which you all revere; his results are frequently put forward with the implication that intracapsular extraction could not give better results. It may surprise American ophthalmologists to hear that, after he read the paper I brought before the British Medical Association meeting in 1903, previously alluded to, he wrote to me:—"If you can devise a method to extract cataract in the capsule you will be a greater benefactor to mankind than Daviel. If I were not over 70 years of age and in delicate health I would go round the world to

see how to do it." This was the first word of encouragement that I received from ophthalmologists and that letter is the foundation of the welcome I have given to American ophthalmologists in Jullunder and Amritsar.

I will now put before you, in a general way, the advantages and disadvantages of these two rival operations. Intracapsular extraction is only within the range of men who have had high class technical training in the art. It is a difficult operation. The capsulotomy operation is a relatively easy and simple one. Intracapsular operation requires a skilled assistant. The same amount of skill is not required on the part of the assistant in the capsulotomy operation.

Any incision, if large enough for intracapsular extraction, and any flap, will do equally well in either operation, according to the preference of the operator. Similarly, an iridectomy or no iridectomy may be done. The intracapsular procedure can be done with equal ease at any stage of maturity. In the capsulotomy operation the cataract should be mature.

After cataract follows the capsulotomy operation and requires to be operated upon. There is no after cataract following an intracapsular operation. Iritis is a frequent complication after capsulotomy but is practically absent after the intracapsular operation. Vision is better after intracapsular than after capsulotomy. Vitreous escape, in skilled hands, is about the same in both operations. Sepsis more frequently follows the capsulotomy operation, often due to tags of capsule left in the wound.

Two disadvantages of the intracapsular operation are (1) a somewhat larger proportion of prolapse of iris in the noniridectomy cases, and (2) a slightly drawn up pupil in the iridectomy cases. Choroidal detachment is equally common to both.

IRITIS. Before I raised this issue in 1903, it was the generally accepted view that iritis following cataract extraction was due to the bruising of the iris in the process of extraction. I stated that chapter would have to be rewrite-

ten, as iritis did not follow in one in 500 cases in extraction of the lens in capsule, thru an entire pupil which had not been acted on by a mydriatic; tho there must of necessity be much more bruising of the iris in the latter case than in the capsulotomy operation. Iritis, therefore, is caused by the lens matter and capsule left behind in the capsulotomy operation, as I have often previously laid down. This view has, since that date, been accepted but no credit has been given to intracapsular extraction for demonstrating this fact. I now go further and say that it is caused more by capsule left behind than by lens matter. This is evidenced by the fact that when the capsule bursts, in the intracapsular extraction, if we are able to extract the capsule and yet leave a little lens matter behind (as is often the case), iritis does not follow, but if the lens capsule is left behind iritis frequently does follow.

Since intracapsular extraction came prominently into the field our opponents of the capsulotomy school tend to make little of iritis, both of its frequency and of its consequences. In my observation it is more frequent than many of the papers published would lead us to believe. It is not an unimportant complication. I consider iritis a serious complication, causing the iris to be cemented to the after cataract and the pupil often to be occluded with a dense membrane, if no more sinister consequences happen. I have seen any number of such cases operated by most experienced operators in India, such patients being told that nothing more can be done for them. If you gentlemen who operate by the capsulotomy method do not often come across such cases you are highly to be complimented. Time does not permit me to deal with the treatment of after cataract of this nature.

AFTER CATARACT is a subject for a whole sitting in itself. If you refer to the journals of the past you will observe that before the year 1903 the treatment of after cataract was the evergreen of ophthalmologic meetings. Before that date the treatment

was regarded as serious, from the point of view of the patient, as the extraction of the cataract itself. Mr. Richard Cross opened a discussion on this subject at the British Medical Association meeting, in 1901, in which he laid down that the ideal extraction of cataracts was in the capsule, but that that was not possible and this was tacitly admitted by the meeting. So much for the significance of the after cataract at that time. Since 1903, if you look up the discussions on after cataract you will notice the change that has come about. It has hardly appeared as a full dress subject at any meeting. You would infer that today it is a trifling, unimportant proceeding associated with no sinister results.

When we consider that Listerism applied then as it does now and that the same instruments and methods were used then as now, the position seems inexplicable. In my observation just as severe forms of after cataract occur now as did then and as severe results are associated with the needling of them. The removal of a portion of the anterior capsule having become more fashionable than it was then, may render the after cataract a little less dense in the case of mature cataracts; but when we recognize the fact that since intracapsular extraction came into the field for any stage of immaturity, the policy of extracting by capsulotomy of immature cataract has also come into the field, with the result that in these cases the after cataract must be dense and must be dealt with; in my opinion dense after cataract is as frequent as ever it was.

This view is supported by the fact that in the United States you have advocates who laud the introduction of needling an immature cataract, so as to cause it to mature in a day or two. This fact is evidence that it is recognized that a dense after cataract follows the same process in America that it does in India. To my mind this method only needs to be mentioned to be condemned. Such a proceeding deliberately produces a traumatic cataract. Who has ever seen a traumatic cataract in a patient without a violent

iritis? I have not and I have seen many of them. I go further and say that these are the most difficult of all cataracts to deal with. If we decide to extract the immature cataract we must put our courage together and extract it in the capsule.

THE INCISION. One of the objections raised against intracapsular extraction is that the incision is of necessity too large, not exceeding 180°. This conclusion would imply that it interferes with the nutrition of the cornea, causes an objectionable amount of astigmatism or is followed by a greater percentage of septic cases than the smaller incision used in the capsulotomy operation.

With my enormous experience I can state that not one of these premises is based on fact. Those who advance these conclusions do not advance a single fact to support their premises. They say—this must follow or that must follow—but “this” and “that” do not follow when examined by hard facts. Our opponents say that we cannot do intracapsular extraction with a conjunctival flap. This is nonsense, we can do it with any flap or any incision provided it is large enough. Much is made, by the way, of the powerful nutritional influence of conjunctival flaps. I saw a dexterous operator do intracapsular extraction thru a Czermak's incision. He subconjunctivally cut two-thirds or more of the sclero-cornea with scissors. I saw a number of such cases several days after operation. They demonstrated that the nutrition of the cornea does not depend on the conjunctiva, as every case had extensive patches of starvation opacities which would never recover. These starvation patches do not follow when the incision does not exceed 180° of the sclero-cornea without a conjunctival flap. It is thus evident to me that the nutrition of the cornea for practical purposes is not thru the conjunctiva.

IRIDECTOMY. It is also advanced against intracapsular extraction that we cannot do this operation without an iridectomy. This is not so; we can do it thru an entire pupil uninfluenced by

a mydriatic, just as well as with an iridectomy. We can go further; we can do it well in cases in which the iris is tied down to the lens by iritic adhesions. In this latter case if you extract by the capsulotomy method you will have violent iritis and its consequences in every or almost every case. You will thus see that our limitations are less than those of our opponents.

VITREOUS ESCAPE. This is the great issue. Our opponents would seem to have much less of this evil than formerly was the case, but on the basis of large series of figures, reaching back into the nineties of the last century, they have to admit 7 per cent. incidence of this complication. A skilled operator by the intracapsular method should not have more. In intracapsular extraction with control of the eyelids as we do it, when vitreous escapes it would be of small amount. In my observation escape of under a third is not followed by sinister consequences. I think the capsulotomy operators will admit that when they have escape of vitreous it is considerable in amount, as they do not control the pressure of the eyelids as we do.

The consequences of escape of vitreous in these two operations are quite different. In the intracapsular we do not fear iritis or irido-cyclitis as a consequence. Our opponents have to admit then when vitreous escapes they have at once to close down leaving the capsule and a considerable amount of lens matter in the eye and that under such circumstances they have frequently a severe irido-cyclitis. Our opponents say that when vitreous escapes it is not renewed. How do they know? Why make such a statement in an off-hand way when it is based on the absence of knowledge. The physiology and pathology of the eye are hardly in their infancy. We must admit that from birth to mature size the vitreous body has grown. This implies a physiologic mechanism thru which it has grown. The statement that vitreous is not renewed after escape implies that that mechanism has ceased to exist when the vitreous has reached mature size. How do they know? They do not

know. I saw not long ago a horse breaker who had both lenses extracted in capsule fifteen years ago. In each eye there had been considerable escape. I examined him. His vision in each eye was better than 6/6, and there was no sign of degeneration. How does the above assertion fit in with such a result. The reverse could far more plausibly be held.

THE PUPIL. In noniridectomy cases, the pupil is as central in one operation as the other. In the case of iridectomy the pupil is more central in the old operation than in the intracapsular, and occasionally much more so. If you use a mydriatic in the old operation, afterwards, you will observe that the pillars of your coloboma are practically always tied down to the after cataract by adhesions tho it may be comparatively free elsewhere. This is the cause of the keyhole pupil. The entire pupil contracts on the center, the iridectomy pupil (if there are no adhesions as in the intracapsular cases) contracts on the point of attachment of the iris to the ciliary region. This mechanically straightens out the key hole into the shape of a U and of necessity draws up more or less the lower part of the pupil.

My ambition is to be able to do without iridectomy entirely. I hope to be able to accomplish this object by finding some drug or some method which will paralyze the orbicularis muscle for five or six days after operation. It is the contractions of the orbicularis which are the cause of the prolapse of the iris. I hope other workers will devote thought and energy to this issue, which I consider one of the most important on cataract extraction as it stands today. Among other things it will eliminate the necessity of an assistant.

DRESSINGS. It is advanced against us that we do not dress and inspect our cases often enough. We must remember that this is one of the most major operations of surgery. Iritis we do not have. The only complications are sepsis, choroidal hemorrhage and prolapse of iris. In my observation sepsis and choroidal hemorrhage defy treatment;

besides such cases give indications and naturally are inspected. Prolapse of iris may give no indication and is much better left alone for ten or twelve days, as interfering with it earlier may cause the patient to burst open the whole wound and has no other advantage. Why should we reverse the canons of surgery by dressing and inspecting wounds daily? By doing so we are depriving the affected area of surgical rest. Such daily dressings are meddlesome surgery.

THE ASSISTANT. We are accused of requiring a skilled assistant. What general surgeon would listen to such an argument. We are also told that to be a perfect operation it must be such that any ophthalmic surgeon can do it as well as any other. Does the general surgeon say that Dr. Cushing's procedure of dealing with a diseased hypophysis is bad because very few will attempt it? Does the general surgeon say that excision of the Gasserian ganglion is bad because very few will attempt it? Still, I hope that the day is not far distant when intracapsular extraction will be considerably simplified.

BARRAQUER'S OPERATION. I recently visited Dr. Barraquer in Barcelona. He received me with the whole-hearted kindness and courtesy of a Spanish gentleman. Dr. Fuchs, Senior was with him. He operated on a few cases before us with his erisiphake. It acted beautifully. He insisted that I should operate also to show him how I did the operation in India. Mine came out as easily and as perfectly as his, and in both cases with the minimum of violence. We three were agreed that in the hands of the two experts there was nothing to choose between them. Dr. Barraquer's instruments may not require as highly a skilled assistant as my method. On the other hand, it is a highly complicated apparatus with plenty of possibilities of going wrong at a critical moment, in the hands of a man who has not thoroly mastered its mechanism and whose fingers have not grown to act automatically.

The instrument requires a technic of its own. Those who have mastered

my technic, I am confident, will have no difficulty in using it as a good deal of the technic is common to the two methods. They are complementary to one another. The erisiphake is but in its infancy, and we have yet to see if it will master certain classes of cases as well as the older intracapsular method, but in most cases I have no doubt it will act beautifully and be a simpler method to acquire skill in. I was immensely pleased to meet Dr. Barraquer, a whole-hearted believer in intracapsular extraction and to see him use his instruments. It has in my opinion come to stay and will help to make matters move on. I congratulate Dr. Barraquer on all the energy and zeal which he has devoted to making this method perfect. When Hulen's instrument came out, I tried to get one as the method appealed to me. Thruout the war we could get nothing of the kind done in England.

CHARACTER OF PATIENTS. It has been repeatedly advanced that what will succeed in Indians—an uncivilized people—will not succeed among nor satisfy a civilized people such as the white races. Those who write thus seem to be unaware that Indians belong to the Ayran race, to which we also belong; and that they were a highly civilized race long before Europeans were. You have only to read Hindu and Buddhistic philosophy to find this out. As regards the whole range of surgery, the people of India measure your worth by results, as much as the people of Europe or America do. It is on this basis that litholapaxy supplanted lithotomy in the last two decades of the last century. It is on this basis that intracapsular extraction of cataract has got the upper hand over the capsulotomy method in India. To assume that you can cut or hack about Indians in any way you please and that they will recover shows gross ignorance. As a matter of fact they are not as good subjects for operation as Europeans. Their vegetarian diet I presume is the cause. This is the best defined in the operations subject to surgical shock. It is not uncommon in the West to see an operator spend one and a half to two, or even

three hours on an intraabdominal operation and for the patient to recover as a matter of course. In an Indian if you expect a similar operation to be successful you must not spend over an hour on it and if you do it in half an hour your death rate will not be nearly so large. The principle herein involved is the same all down the line, cataract included. The Indian has not anything like the same recuperative power as the European.

CONCLUSIONS. It is often advanced by implication that my facts are worthless because I am overworked, and that by men who are not aware that cataract is but a part of my work. I had once a distinguished member of the profession on a visit; when leaving he told me that he wondered how I got thru the work, but he now understood. He said, "you are not overworked, you are not hustled; it is your organization that is the explanation; every one about you has got his job and knows it, and has got to do it leaving what you want to yourself." After thirty years on the plains of India I do not look like a man who has been overworked.

As regards my facts, I have satisfied myself, I have published statistics of cases selected before operation which should satisfy the most fastidious. To publish the details of between 40,000 and 50,000 cases would make up a volume in itself, which I presume no one would read. Those who have visited my clinic have seen everything, there was nothing concealed from them.

As regards the status of intracapsular extraction of today, views expressed in papers of the West are misleading and take too narrow a view of the outlook. It is a yellow peril. I think I am not overstating the case when I say that close on 25,000 cataracts a year are done by the intracapsular methods in India, and that ten years hence we may have to add another ten thousand. Thus India will have a voice in the decision. This method has come to live and dominate its opponent in the whole East, and in my opinion will come to be the operation the world over twenty years hence.

UVEITIS WITH DENSE VITREOUS OPACITIES; PARTIAL RECOVERY.

ROBERT H. BUCK, M.D.

CHICAGO, ILLINOIS

In the case here reported vision was reduced to perception of hand movements for a year. But ultimately recovered in both eyes to eight-tenths. Read before the Colorado Congress, July 29, 1921.

While the literature of uveitis is so extensive as to discourage further additions, the case I desire to report has some features in which it does not conform definitely to any particular type, and it belongs to a group to which comparatively scant consideration has been given. This is due in part to the relative rarity of this type of cases and in part to the difficulty of observation and treatment in these cases because of the tender age of the patients usually affected, a handicap to which I was not subjected as my patient was an adult. I refer to the non-suppurative type of metastatic ophthalmia occurring as a sequel of acute and chronic infectious diseases.

The very voluminous literature on the subject of uveitis to be found in the textbooks, in various works on pathology of the eye, in the American Encyclopedia of Ophthalmology, in exhaustive treatises and in two excellent symposia, one presented before the Ophthalmologic Section of the American Medical Association in June 1902, the other before the Ophthalmological Section of the International Medical Congress in London in 1913, deals extensively with the ordinary forms, i. e. the ectogenous and the pyogenic types of endogenous infections of the uveal tract, the prognosis of which if the vitreous has been invaded, is extremely grave; and also with those forms of nonsuppurating uveitis due to the specific venereal diseases and tuberculosis. As a consequence there is more or less overshadowing of the nonsuppurating type due to infectious diseases in children, the prognosis of which should be made guardedly and the treatment persisted in over an extended period.

Axenfeld in his Pathology of the Eye, and Fuchs in his Text-book of

Ophthalmology, consider the condition under the heading of Metastatic Ophthalmia. Parsons treats of it as a form of exudative choroiditis, and Wilder devotes a paragraph to the subject in his contribution to the American Medical Association symposium above mentioned.

While these cases are clinically and anatomically true types of uveitis, they differ materially in their pathologic manifestations from the type due to infection by pyogenic germs.

According to Fuchs, "they are without doubt also due to endogenous infection by bacteria, and in part perhaps to the action of the toxins which are formed in the body. In any case the inflammations thus produced are not so violent and destructive as those due to infection by the pyogenic organisms. The exudation develops more gradually and remains more confined to the tissue itself. The tissue is infiltrated chiefly with uninuclear leucocytes, which tend to accumulate about the blood vessels under the form of scattered foci. Thus along with the diffuse infiltration there are formed nodular exudates which in the ordinary traumatic inflammations are only exceptionally met with. In correspondence with the nonsuppurative character of the inflammation is its outcome, which is also less serious. Panophthalmitis never results and even atrophy of the eyeball is a comparatively rare sequel, occurring only in particularly severe or in often recurring cases."

The vitreous chamber sometimes fills with a dense exudate of a grayish color which may be seen pressed up against the posterior surface of the lens and almost completely obscuring the fundus reflex. In some cases the exudate remains subretinal, resulting in a condition known as pseudoglioma

for which the eye is frequently enucleated.

The case I am about to report is one of metastatic ophthalmia following mumps, and my reasons for making this report are:

First; Because of the comparative rarity of this disturbance in an adult.

Second; Because of the very gratifying results obtained by long continued persistent treatment in spite of the discouraging outlook, and

Third; To lay stress on the comparatively favorable prognosis in this type of cases by a case in point.

A previous experience with a case of recurrent retinal hemorrhages which was reported in the AMERICAN JOURNAL OF OPHTHALMOLOGY for October 1919 gave me much experience and encouragement in the treatment of this one. In the case to which I refer the patient who had lost the vision in one eye within two months in a previous attack, retained 8/10 vision in the remaining eye in spite of repeated attacks of hemorrhages and the condition has now become quiescent. For the past two years he has been employed as a drug salesman calling on the trade, doing the necessary reading of small print in a price-list and all the clerical work his occupation entails.

CASE REPORT. Mr. C. E., age 23, single, farmer, American birth, German descent. Family history negative both as to communicable systemic diseases and ocular disturbances. Had no serious illnesses previous to the present trouble and denied having had any form of venereal disease.

In 1917 he enlisted in the army and in March 1918 while in camp, he developed a severe attack of mumps which was complicated by orchitis of the right testicle, necessitating hospitalization for a period of two months.

In June 1918 his right eye became inflamed and vision began to fail but there was little pain or lacrimation and no photophobia. This disturbance progressed in spite of treatment until in September the vision was reduced to hand movements. He stated that his teeth were x-rayed and several blood Wassermann tests made, all of

which were negative. General physical examination threw no light on the etiology. The inflammation subsided, but vision did not return.

In February he was discharged from the army and while on his way home, without premonitory symptoms of ocular disturbance, vision in the left eye began to fail. The eye was evidently suffused with blood for he stated that all he was able to see was of a bright red color. This phenomenon was not accompanied by pain. The red color disappeared but his vision was so reduced that he was able merely to see shadows.

For a time he received no treatment, then on July 29th, 1919 he entered a U. S. Public Health Hospital. The hospital records showed that he was under treatment for uveitis and that various tests had been made to determine the etiology. His tonsils were removed. He was examined by three eminent oculists none of whom offered him any encouragement.

I first saw him on September 9, 1919. Examination. O. D. V. Shadows. O. S. V. Fingers at one foot in lower temporal quadrant of field. About 15° of divergence. Right pupil 5 mm., left 7 mm., both round, react to light. Right eye. Fair light projection. Conjunctiva slightly injected and chemotic. Cornea perfectly clear. Anterior chamber moderately deep, aqueous clear. Upon dilatation with cocaine, the lens clear and transparent with a few small spots of iris pigment adherent to anterior surface. Mass of vitreous opacities pressed close against posterior surface. Eye not painful but slightly tender over ciliary region. Tension normal. Ophthalmoscope revealed dense opacity occupying entire vitreous with fundus reflex a mere line around the periphery. By focal illumination these opacities were of a grayish color. Visual field absolutely blank.

Left eye. The findings on oblique examination were practically the same as those in the right eye. With the ophthalmoscope a small area of the fundus could be seen in the upper nasal quadrant. The visual field com-

prised merely a small peripheral segment of the lower temporal quadrant.

The Wassermann, both blood and spinal fluid tests, and the cutaneous tuberculin test were negative.

Examination of the nose and accessory sinuses and throat revealed no pathology. General physical examination failed to uncover any etiologic factors.

TREATMENT. Locally atropin and dionin and hot applications were ordered. He was given subconjunctival injections of salt solution. Internally he was given increasing doses of potassium iodid. Mercury was administered by inunction and he was given pilocarpin sweats and hot packs. This treatment was persisted in for several months.

December 3, 1919. O. D. V. Shadows. O. S. V. 1/10 thru the lower temporal quadrant. Right eye. Slight broadening of the fundus reflex sufficient to reveal a patch of choroidal atrophy or an organized white mass near the periphery on the temporal side. Field still blank. Left eye. Opacity seemed less dense with a peripheral visual field, broader in the lower temporal quadrant. Tension normal in both eyes.

The dosage of potassium iodid had now reached 180 grains a day and he was beginning to show signs of lowered vitality, hence the drug was discontinued for a period of two weeks and begun again at five grains t.i.d. Baths and sweats were also given less frequently. Local treatment was continued with dionin alternated with yellow oxid ointment every three days. Mercury rubs had been used only at intervals for some time. Subconjunctival injections were changed to cyanide of mercury, given weekly alternately in each eye.

January 30, 1920. O. D. V. Fingers at one foot in the temporal side of the field. O. S. V. 3/10 thru the lower temporal quadrant. Right eye. 15° divergence. Opacity less dense and further broadening of fundus reflex. Spot of choroidal atrophy on temporal side. Left eye. Marked improvement, central scotoma smaller.

March 26, 1920. O. D. V. Fingers at one foot in temporal side of field. O. S. V. 5/10 thru lower temporal quadrant. He was now able to read large type, such as headlines in a paper, at 15 cm.

June 11, 1920. O. D. V. Fingers at one foot, as before. O. S. V. 6/10 central vision. Jaeger 5 at 15 cm. Right eye diverges at 15°. Large central opacity surrounded by clear area, large opacities deep in vitreous.

Left eye likewise central opacity but less dense and fundus can be plainly seen all around periphery. Tension normal in both eyes. Large central scotoma in both fields. Treatment continued as last outlined.

July 21, 1920. Condition slightly improved and he was permitted to go to work. He had useful vision in the left eye only, but with this he was able to read typewriting.

December 3, 1920. Vision again failed and he was compelled to discontinue work. Cloudy vitreous, opacities in both eyes. Former treatment again resorted to.

January 13, 1921. O. D. V. 6/10. O. S. V. 6/10. Right eye. Note marked improvement in vision. Ophthalmoscope revealed a general red reflex, tho vitreous opacities were still very dense and freely movable. No fundus details could be seen and patch of choroidal atrophy was no longer visible. Left eye. Much loose grayish-white material moving about in the vitreous so that fundus was obscured altho there was a fair red reflex. Tension normal in both eyes. Fields of both eyes were clear in peripheral portion with relative scotomata surrounding the blind spot in each eye. Divergence was still 15° and he now complained of diplopia.

July 19, 1921. O. D. V. 8/10. J.3 at 15 cm. O. V. S. 8/10. J.3 at 15 cm.

Pupils dilated with homatropin. Retinoscopy O. D. + 1 vertical + 1.50 horizontal. O. S. Could not get shadow.

At trial case vision was more clear with O. D. + 0.50c axis 90. O. S. + 0.50c axis 75.

Tension normal. There was 20° divergence of the right eye, the left being the fixing eye. Fields were full sized but there was a considerable relative scotoma enlarging the blind spot temporally. Color fields were normal.

Ophthalmoscope. Right eye. Revealed a dense white mass occupying the center of the vitreous (*retinitis proliferans*), the remainder of the vitreous containing many large and

small opacities. The region of the macula was fairly distinct and portions of retinal vessels could be distinctly seen in various portions of the field. The disc was completely obscured as was also the patch of choroidal atrophy referred to.

Left eye. Many large and small vitreous opacities but no definitely organized mass. No fundus details discernible.

THE SPECIFIC PRECIPITIN REACTION OF THE LENS.

LUDVIG HEKTOEN, M.D.

CHICAGO, ILLINOIS.

This paper sets forth the facts regarding the specific reaction of the higher vertebrates to crystalline lens substance. This is essentially the same whatever the species from which the lens is obtained. Read before the Chicago Ophthalmological Society, May 26, 1921.

It was discovered by Uhlenhuth that the lens of different species gives the same immune reactions. A lens antiserum, produced let us say by injecting a rabbit or guinea-pig with beef lens, will react in precipitation, anaphylaxis and complement fixation tests not only with beef lens but also with the lens of other mammals, of birds, and of amphibians. With fish lens the reaction, however, is very faint. The specificity of the reaction is determined not by species, as in other immune reactions (blood, serum, bacteria), but by the organ from which the antigen is derived as illustrated by this scheme:

	Lens	Serum
	Antiserum	Antiserum
Lens (homologous)	+	0
Lens (heterologous) ...	+	0
Serum (homologous) ..	0	+
Serum (heterologous) ..	0	0

So far the lens is the only clean cut example we have of this organ-specificity as contrasted with species-specificity in antigen-antibody reactions.

I have studied the precipitins that develop in rabbits on the injection of lens solutions in 0.9% salt solution; approximately 10 or 20% solutions by weight of beef, horse, rabbit, sheep and swine lens, removed with special care to avoid admixture with blood or serum, have been used. As a rule four

or five injections of lens solution are given intravenously at four day intervals, first 2-4 c.c., increasing gradually to 12-16 c.c. The highest titer of the serum is reached about the eighth day after the last injection. Most of my work has been with antisera that would cause precipitates in lens dilutions of at least 1 to 5000 and often much higher. The injection of rabbits with solutions of rabbit lens, however, does not have the same antigenic effect as the injection of lens of other species, and as contradictory results are reported on this point, further study is required.

Table 1 shows that all the lens solutions used (beef, chicken, dog, guinea-pig, horse, human, monkey, rabbit, rat, sheep, swine) react in the same way with beef lens antiseraums; further that this antiserum does not react with the serum of beef blood or of the other species represented and conversely that beef serum antiserum does not react with any lens solution. The organ-specificity of the lens holds good thruout and the lens does not appear to contain any species-specific antigens. Horse, sheep, and swine lens antiseraums have precisely the same effects as beef lens antiserum.

The aqueous and vitreous humors contain lens substance because these fluids in low dilutions or full strength react with lens antiseraums. These hu-

mors react with serum antiserum also—not always—and then the law of species-specificity obtains. The presence of lens substance in the humors is interesting and the question arises whether the lens substance in the humors is derived from the lens or on the way to be incorporated into the lens.

Table I also shows that the serum of a rabbit injected with extract of beef cornea reacts with beef serum, beef vitreous, and beef aqueous, but not at all with beef lens or any other lens, indicating that the cornea contains species-specific proteins only.

We see then that the precipitin reactions of the lens of certain mammals are lens-specific and that the lens does not appear to contain any species-specific precipitinogens, hence the lens protein may be regarded as chemically distinct and as identical in diverse species.

Note—The precipitation in sheep vitreous horse and sheep serums by beef serum antiserum and beef cornea antiserum are examples of species-specific reactions extending over to related species.

	LENS PRECIPITIN REACTIONS		
	Beef Lens Antiserum	Beef Serum Antiserum	Beef Cornea Antiserum
Beef Lens	+	○	○
Chicken Lens	+	○	○
Dog Lens	+	○	○
G. Pig Lens	+	○	○
Horse Lens	+	○	○
Human Lens	+	○	○
Monkey Lens		○	○
Rabbit Lens	+	○	○
Rat Lens	+	○	○
Sheep Lens		○	○
Swine Lens	+	○	○
Beef Aqueous	+	+	+
Dog Aqueous	+	○	○
Human Aqueous	+	○	○
Rab't Aqueous	+	○	○
Sheep Aqueous	+	○	○
Swine Aqueous	+	○	○
Beef Vitreous	+	+	+
Dog Vitreous	+	○	○
Human Vitreous	+	○	○
Rab't Vitreous	+	○	○
Rat Vitreous	+	○	○
Sheep Vitreous	+	+	+
Swine Vitreous	+	○	○
Beef Serum	○	+	+
Horse Serum	○	+	+
Human Serum	○	○	○
Monkey Serum	○	○	○
Rab't Serum	○	○	○
Sheep Serum	○	+	+
Swine Serum	○	○	○
Beef Cornea	○	+	+

CATARACT OPERATIONS IN THE AGED.

SAMUEL G. HIGGINS, B.S., M.D.

MILWAUKEE, WISCONSIN

The special forms of cataract that occur in the aged and the time when extraction is indicated are mentioned. The bearings of pathologic conditions, local and general, upon operation are discussed. Practical hints are given for overcoming the special difficulties of dealing with unreasonable patients and those lacking selfcontrol. Read before the Wisconsin Surgical Association, May, 1921.

To say when a person is old is indeed a matter of relativity. I look upon persons of 80 years or over as aged. My observations for the most part are on the old men in the National Soldiers Home in Milwaukee who exhibit the usual forms of cataract; degenerative hypermature Morgagnian cataracts are rare.

In case the cataract has lost its mother-of-pearl grayness when viewed by oblique illumination and is distinctly milky, I approach the operation with much timidity. Preliminary iridectomy prepares the eye for less hazardous irrigation of the anterior chamber. When the amber brown nucleus is visible, an attempt to remove as much of the lens as possible is made before irrigation is employed. The capsule forceps seems to me to be followed by quicker release of the hard nucleus than when the cystome is used.

When the lens is mature, light perception prompt, and the eye healthy with full anterior chamber, clear sclera and cornea, and tension right, any cataract technic may be selected. This provides of course that the patient's general fitness and demeanor are correspondingly favorable.

As I recall the run of patients, more than half of the number present themselves while the vision is failing and when the cataracts are immature. It is at this stage that the distant and near vision (with glasses) are carefully recorded and the fundus under mydriasis. In this connection I feel that a much better study of the fundus, as well as of the lens, can be made when the pupil is widely dilated. Euphthalmin is the favored drug. Cocain dilates the old pupils slowly; one disk of homatropin and cocaine, each 1/50 grain, is satisfactory and has not

been observed to be followed by any increased intraocular tension.

Preliminary iridectomy has become my practice in immature cataracts. Other things being equal the eye with poorer vision is operated first. Gentle massage applied directly to the lens with the flat iris replacer is quite routinely done, tho the effect of this proceeding is extremely variable. A second massage of this kind is occasionally repeated using the edge of the spatula. Puncture of the anterior capsule with the cystome, avoiding an incised line, is very effective. Extraction is attempted when the details of the fundus cannot be seen anywhere thru the lens even tho there are areas showing some red reflex.

Next in importance to the form of cataract present is the health of the eye. I do not view a cataractous eye as tho it were a healthy eye. To operate an eye that does not respond to light is useless; this condition is paramount contraindication to cataract operation. Light perception to colored lights adds more cheer to the prognosis. I have seen little difference in the result whether the eye is myopic or hyperopic, tho the great majority of the cataract patients have shown me hyperopic distance glasses.

Scars upon the cornea may influence the location of an iridectomy or determine the advisability of simple extraction without iridectomy. Results of iritis being frequently present, or of ulceration of the cornea, a wide dilation of the iris even under atropin will locate fine synechia either anterior or posterior. If the adhesions appear to be firm or extensive a Ziegler knife or similar needle knife, will sever the adhesions which operation can later be followed by preliminary iridectomy.

Do these old eyes and old people tolerate these repeated operations? A difference of opinion is justifiable, but it is in my opinion that these eyes do better this way than when subjected to the complete cataract extraction at one sitting.

There is a consensus of opinion that the extraction of a cataract when the eye is in an attack of glaucoma is a very hazardous undertaking. In a less degree is there danger in the presence of chronic glaucoma. Attempts at wide glaucoma iridectomy, or even freeing of adhesions, may excite acute glaucoma with rapid sustained intraocular tension—such tension that the optic nerve is markedly damaged. The non-operative treatment of glaucoma had best be given a thoro trial. Relief of tension by sclerotomy followed by preliminary iridectomy, or the severing of an adhesion, may be attempted previous to the cataract operation.

Diseases of the eyelids should receive careful attention. Ectropion, of which there are many cases in the Soldiers' Home, and entropion should be previously operated. Old scars from trachoma need not contraindicate cataract operation, if one is sure that no acute process is present, or that rough areas on the lids do not harbor other microorganisms. I look with suspicion upon all follicles of the conjunctiva, granular or thickened areas, or small swellings near the lid margins. Such areas should be treated for weeks if necessary, cauterized, actually burned away or excised and the conjunctiva made germ free before a cataract operation. Chalazia are sometimes very persistent in old people. Thoro incision and curetting of these lumps seems warranted. Redness and congestion about the roots of the eye lashes in old people means more than blepharitis marginalis with eye strain. Such red lid edges may be evidence of the bad habit of rubbing the eyes with soiled handkerchiefs or fingers.

Dacryocystitis is the condition I most dread. Thoro treatment should be undertaken and completed even to the point of extirpation of the infected lacrimal sac as long as mucopurulent

secretion, or mucus, can be squeezed from the tear duct. Ligature closing of the canaliculi is recommended by many writers.

Beyond correction of the pathology of the globe itself and of the adnexa, I believe that the less you disturb these old people the better. One would not think of operating during the time of an acute suppurative sinuitis as he would not in the presence of an acute laryngitis, tonsillitis or bronchitis. But what can you do when the patient has had for years pus in the nose from old ethmoidal sinuitis? Perhaps suture the tear duct. If I should insist that all dirty teeth, necrosed and pyorrheic, of my cataract patients be extracted I fear that I would be doing but few cataract operations. However I do not like to see these filthy mouths, and I do recommend cleansing and extractions when favored with intelligent co-operation.

Disturbing bronchitis with cough, asthmatic tendencies, indigestion with belching or flatulence, and constipation or diarrhea require appropriate and palliative treatment. Inevitable arteriosclerosis, valvular heart disease, chronic nephritis and glycosuria do not contraindicate cataract operations.

Having learned of the presence of sugar in the urine, a few weeks attention to this condition may be of some value, but this is doubtful in very old patients. Better to ascertain the probability of acute exacerbations and effects of other operative procedures than to worry the patient and yourself over possible complications. The history of eclampsia or uremic disease in women may warrant protracted treatment of chronic nephritis or albuminuria. Fisher, in reporting delirium following eye operation refers to Casey Wood's admonition: "In every case the condition of the bladder, plevis, urine and blood should receive attention." The attention that can be given an old person is relief from active inflammation or distress, and after that you proceed with the operation.

Delirium is very rare after cataract operations in the Soldiers Home. I attribute this to the fact that the pa-

tient is not prepared for delirium. He sees other patients whose cataracts have been removed, he visits with them, knows that they go their way unattended and use the newspapers. After the operation he is placed in the ward with other patients and no one seems unduly anxious over his recovery. He is instructed as to his conduct in this new experience; but he is talked to as an intelligent person who is expected to cooperate with the surgeon and the hospital attendants.

The risk of delirium or acute psychosis is in my opinion inherent with the patient. One may word his observations as Edward Jackson did on this subject: "The obscure nutritive failure that produces senile cataract, is closely allied to the obscure nutritive deterioration that predisposes to insanity. One may suspect that such a predisposition may be lurking in a large proportion of patients suffering from senile cataract." Two fairly recent patients afford illustrations. One woman was operated in a private sanatorium. She refused to speak to me or reply to any question put by me during the operation. The special nurse was permitted to attend to the technical arrangements for the operation but the patient's personal requests were transmitted thru her usual nurse. The vision following the operation with glasses was 20/20 her manner toward me during the refraction was sullen and resentful. Another woman of most courteous and affable manner refused to keep her fingers from the dressing or remain quiet in bed following preliminary iridectomy. Even in my presence the evening of the operation she persisted in touching the bandage, always with some childish excuse. This woman had been in the sanatorium on two previous occasions. To complete the operation might place her in the sanatorium again. As long as her vision permits her to walk about without assistance I believe it better judgment to defer the cataract operation.

If I have implied that delirium and acute psychosis may be suggested by the surgeon I should state positively that a nervous operator will excite ac-

tions on the part of the patient. The moment of the cataract operation is no time to reform the patient or break an 80 years stubborn disposition. Preparation for cooperation comes before the actual operation. If it is discovered as late as the completion of the anesthesia that the patient is unreasonable I would rather do an iridectomy and wait on the extraction than risk the operation. If the patient is upset, due to the presence of an excited relative, or has taken a personal dislike to the assistant, nurse or myself I feel that the result will be better to await subsidence of such idiosyncrasies.

Rather than bump the patient in and out of the hospital elevator I prefer to operate the patient in his own bed. For this purpose the ordinary hospital bed with two mattresses and the patient's head at the foot of the bed is satisfactory. The height of the bed can be raised by placing a brick or similar block under each leg of the bed. At the Soldiers' Home the bed is prepared in the surgical ward and screened off from the other patients; a private room is used in other hospitals.

It is greatly to be desired that one experienced nurse be in charge of preparation and all technical arrangements for cataract operations and be always assigned to this service in private hospitals. A nurse in training may be palmed off in the tonsil room, or even for mastoid surgery, but not for cataract operations. A detail of sometimes vital importance so often emphasized when I was assisting Casey Wood is the care and inspection of drugs and droppers and irrigating solutions. The solution used to irrigate the anterior chamber should not only be sterile but always free from lint or long cotton fibers. An older nurse or one with inherent tact and adaptability is the choice for special nurse after the operation. Vail reports that Colonel Smith prefers that his patients be attended by their native relatives. I feel that the surgeons had best select the one or two trusty relatives, and suggest that the patient know that they are present or within call and all

other interested relatives or friends be excluded.

I do not disturb the dressing or inspect the eye before the third, fourth or fifth day. If there is no complaint let the eye heal; if pain or uneasiness arise inspect sooner. On completion of the toilet of the operation a drop of 20% argyrol is placed over the incision, a line of bichlorid of mercury (1/3000) ointment is squeezed from the tube between the lid margins of

both eyes, eye pads of cotton or gauze applied, and both eyes bandaged. If delirium threatens, the bandage may be removed soon from the unoperated eye. Adhesives on the lids to prevent winking, eye shields and masks have all been gradually dispensed with, as no accidents have been experienced suggesting their utility. Postoperative cathartic is not given before the fourth day and then an active cathartic such as magnesium sulphate.

EYE COMPLICATIONS OF THE DISEASES OF CHILDHOOD.

H. C. PEABODY, M.D.

WEBSTER, S. D.

The more common lesions of the eye occurring with the acute infections of childhood are here described. A case of blindness permanent in one eye arising in whooping cough is reported. Abstract of paper read before the Sioux Valley Eye and Ear Academy, July 12, 1921.

While eye complications in the diseases of childhood are not exceedingly common in occurrence, it is important that they should be recognized early, the warnings that they bring taken heed of and the proper treatment for them instituted. It will be possible for me to mention only the most prominent instances of ocular involvement and I will classify them under their respective headings. The diseases considered in this paper with reference to their eye complications are scarlet fever, measles, diphtheria, whooping cough and mumps.

Some variety of conjunctivitis is a common accompaniment of all these diseases, with the exception of scarlet fever. It is surprising that the conjunctiva does not more often take part in the inflammation in scarlet fever, when we realize how common it is for the middle ear to become involved, with the added fact that the mucous membranes of the nose and throat are invariably involved. I have found that it is not enough to tell the nurse to keep the eyes washed out with boric solution, but we must instruct her carefully just how to irrigate and cleanse the eye properly, and how to instil a bland ointment in order to prevent the adherence of the lids and the sub-

sequent danger of injury to the cornea, when the lids are forcibly opened.

SCARLET FEVER. Albuminuria accompanies nearly all cases of scarlet fever. The most severe renal complication is that designated as postscarletinal nephritis (a diffuse nephritis), usually developing during the 3rd or 4th week of the disease and following the mild as well as the severe cases. An albuminuric retinitis, or a uremic amaurosis, very suddenly developing, may occur. The retinitis, in itself, presents a good prognosis, owing to the youth of the patient; and like the renal affection of pregnancy, it occurs often with a benign kidney lesion.

Optic atrophy in proportion to the retinal destruction may be expected. In differentiating the retinitis from the uremic amaurosis, we find in the blindness resulting from the uremia, that the pupil still reacts to light, showing that the affection cannot be in the eye or optic nerve but must be higher up as a result of poisoning; also, in uremia, the blindness is sudden and complete, and the ophthalmic findings are negative. Optic neuritis, orbital cellulitis, purulent choroiditis, and ulcerus serpens are very rare complications of scarlet fever.

MEASLES. As is well known, this

disease, in the first stages preceding the eruption, is characterized by catarrhal symptoms of the nasal mucosa, photophobia, epiphora and a hyperemic conjunctivitis which generally disappears after two or three weeks without bad results.

In order to overcome the photophobia, these children develop a marked blepharospasm which later increases the conjunctivitis so that a vicious circle is established. Only in exceptional cases does the conjunctivitis become blennorrhoidal. It is in these cases that the cornea is endangered. In poorly nourished children, a chronic condition is often the end result. In addition to the routine treatment already suggested, Holt brings out a fine point in protecting the sensitive eyes of the patient, e.g., that the bed should be screened, but not to exclude the sunlight from the sick room.

DIPHTHERIA. In this disease, eye symptoms play a very important part. The widespread effects seen in diphtheria are due to the action of the toxins, which the bacillus produces during growth on mucous membrane. We may have a severe diphtheritic involvement of the eyelids and conjunctiva, as all mucous membranes are subject to the disease process. Fortunately tho, the condition is rare and is probably due to accidental infection rather than to extension thru the lacrimal duct. Before the advent of antitoxin, this almost invariably resulted in destruction of the eye. In the more severe true diphtheritic form, the cornea rarely escapes. If the entire area of the conjunctiva is infiltrated and rigid, the cornea is irretrievably lost. The prognosis, therefore, in the severe cases is very serious as regards the eye.

The most interesting and the most common eye complications in diphtheria are the paralyses which develop, usually making their appearance during the latter part of the disease or often weeks later. It may follow cases so mild that a diagnosis of diphtheria was never made. Rose reports in 171 collected cases of diphtheria that the eyes were involved in 77 of the cases,

in 54 of which the muscles of accommodation were involved. Rolleston reports 477 cases with ciliary muscle involvement in 236, or 53%, and extraocular muscle involvement in 80, or 18%. Diplopia in the extrinsic paralysis and inability to read in the intrinsic cases are the most common complaints. The prognosis for these cases is as a rule very good.

MUMPS. Edema of the lids may occur. Conjunctivitis as well as chemosis of the conjunctiva, the latter due to compression of the vessels of the neck, occurs. The lacrimal gland may participate in the involvement. Optic neuritis, iritis and ocular paralysis have occasionally occurred. In a number of instances, permanent blindness results, Woodward collected twenty three cases of optic neuritis and neuroretinitis.

WOOING COUGH. Conjunctivitis and epiphora are common in the prodromal stage. Photophobia and mydriasis may indicate the transition from the catarrhal to the convulsive stage. The extensive hemorrhages which, owing to the violent coughing, may be subconjunctival or even orbital are important. In the latter case, they may be so severe as to cause a proptosis. Cerebral hemorrhages may give rise to complications. Hemorrhages into the meninges are far more common than those into the brain itself.

CASE. C. J. Age 4. Sex, male. Personal and family history, negative. First week of January, 1921, he came down with whooping cough. Spasms of coughing very hard and frequent. During the first part of March, the coughing spells had begun to subside in frequency, but their severity remained about the same. About March 23rd, the child developed a bronchial pneumonia. The first eye symptoms noticed by the parents were on the 26th, during the time the child was having convulsions. The father states that the eyes appeared glassy, and the child kept his eyes closed all the time. My assistant saw the patient on the 28th of March. Both eyes were closed, marked photophobia, moderate swelling of the lids, both eyes protruding,

both pupils markedly dilated, neither reacted to light. Both eyes rotated out and upward. No meningeal manifestations elicited. Within a week the movement of left eye was normal, with vision returning gradually reacting more and more to light, right eye remaining the same. Within a day or two after this I first saw the case. Examination disclosed the following: Right pupil completely dilated, no reaction to light. An exotropia of about 15°, combined with a hypertropia of about 10°, present. Fundus was negative. Unable to determine any vision whatever. Left eye: Vision for small objects. Pupil reacting to light. Fundus examination showed a small hemorrhage just above the disc.

The parents were instructed to bring the child into the office for further examination as soon as he had sufficiently convalesced. It was not, until the 28th of June, that I saw the case again, the child having had three or four

relapses. Right eye still turned out and up, but only about 5°. There was no reaction to light with the good eye closed, altho the child slightly jerked when I threw the light into the eye. Light cast in left eye caused both pupils to contract. No limitation to eye movements in either eye. Right fundus examination, possibly a slight pallor of the disc. The small hemorrhage had disappeared from the left. Ears, nose and throat, sinuses and teeth, as well as physical examination, were negative.

It will not be out of place in this connection to mention some of the eye complications or sequelae which are not necessarily of the diseases of childhood mentioned. In the cachexia following severe cases, we may have infiltrative as well as suppurative involvements of the cornea which at times have led to the loss of the eye by panophthalmitis. Fortunately this is rare.

NOTES, CASES AND INSTRUMENTS

THE USE OF IODIN IN CORNEAL ULCERTION.

DR. HARRY W. WOODRUFF

JOLIET, ILLINOIS

The communication of Dr. Harold Gifford on the use of tinctur of iodin in herpetic corneal ulceration (see Amer. Jour. Ophth., Aug. 1921, p. 604) prompts me to write of a similar solution of iodin and of a method of application which adds greatly to its effectiveness. My attention was called to the following solution in an article in the Journal Amer. Med. Assn. by Dr. Talbot, a Chicago dentist, several years ago.

Zinc Iodid .....	.15
Iodin (Cryst) .....	.25
Glycerin .....	.50
Distilled Water.....	10

This solution is not as fluid as the tinctur of iodin and also does not evaporate rapidly. The position of the patient when making the application is also important. If the patient is recumbent or in such a posture that the ulcer is pointing straight upward the thick concentrated iodin solution will more readily remain in the furrow caused by the ulceration. This may be allowed to remain for several minutes and more may even be applied with less danger of the healthy corneal tissue being affected. Naturally this treatment is also of value in the deeper forms of ulceration, as the concentration of the solution and its longer application increases its effectiveness many times.

PANOPHTHALMITIS FOLLOWING PERFORATION OF THE GLOBE BY A PIECE OF BURST BUTTON.

W. GORDON M. BYERS, M. D.,

MONTREAL, QUEBEC.

Ruth L., aged 13, was brought to me with the statement that her eye had been "cut" five days previously, while playing "buzz-saw," that is, the common game of causing a button to revolve rapidly in opposite directions by

alternately tightening and relaxing a loop of string threaded through the button.

The clinical picture was that of a well established panophthalmitis. Infection had obviously taken place thru a large gaping wound, which lay just outside of, and closely paralleled, the upper-inner fifth of the cornea. The opening was filled with uveal tissue, and the pupillary area, irregular from the prolapse of iris, was occupied by grayish-yellow exudation. There was a faint red reflex only from the fundus. V. = p.l.; but the projection was faulty to the left and up and down. T. slightly reduced.

An enucleation was done; and at the moment of severing the optic nerve, half of a "Mother-of-Pearl" button, about three quarters of an inch in diameter, with a thinned edge, was expelled from the wound. The substance of the button seemed more porous and friable than usual. It had apparently been made from a poor piece of shell, or from shell of an inferior type.

Injuries to the eye from the game of "buzz-saw" have apparently not heretofore been reported; but this case shows, unfortunately, that it is liable at times to be followed by serious consequences.

CARE OF THE EYE FOLLOWING REMOVAL OF SMALL FOREIGN BODIES FROM THE CORNEA.

W.M. C. BANE, M.D.

DENVER.

Read before the Colorado Congress, July 29, 1921.

Those of us caring for the eyes of railway employees and mechanics in machine shops have from time to time under our care a goodly number of eye cases having small foreign bodies in the cornea. The most troublesome cases to me have been those who have received first aid by a local surgeon or by a fellow-workman who has endeavored to remove the foreign body.

The foreign bodies are mostly de-

posits of emery; some of hot cinders, and occasionally small bits of metal. Those with metal of any size are, as a rule, sent to us at once without treatment other than a protecting cover. The first treatment consists of removal of the foreign body under local anesthesia by sterile spud or spear pointed instrument.

The best illumination and magnification obtainable should be made use of. My object in presenting this subject is to emphasize the importance of the after dressing and care to obtain the most rapid healing and minimum scar.

There was a time when, after removal of the foreign bodies, (a cinder or bit of emery), I dismissed the patient without any protection to the eye, and seldom was any after attention required. An occasional patient came for after attention, owing to slow healing or ulceration from infection.

In recent years I have had impressed upon me the importance of sealing the eye for 24 or more hours after the removal of the foreign body. There are three reasons for such a measure. First, the corneal tissue normally does not have any blood vessels, but receives its nourishment by imbibition, second, the closing of the eye prevents the admittance of infection thru the dust coming in contact with an open wound, and third, movement of the lid causes discomfort which is minimized by a compress bandage.

Immediately after removal of the foreign body, I apply some sterile vaseline in the palpebral aperture, then a small triangular pad of gauze with cotton between its layers, and adhesive strips retain the pad on the closed eyelids. (Method of covering the eye demonstrated). The patient is advised to leave the pad undisturbed for 24 hours and to return for further attention if the eye is not comfortable. Otherwise the pad can be removed. If a second visit is made fluorescein is used to determine whether or not the healing is complete. As a rule the corneal wound is found healed. It is surprising how rapidly nature will fill the gap and cover it with epithelium. After a corneal abrasion with loss of considerable of the epithelial layer,

upon sealing the eye it is surprising how rapidly the destroyed epithelium is reformed.

A patient with denuded area comes complaining of the eye being painful. After cleansing under local anesthesia and the application of a simple ointment and sealing of the eye, the pain ceases.

Subsequent to furnishing the topic for this paper, I read with special interest a paper by Dr. J. Ellis Jennings on "Removal of Foreign Bodies From the Cornea and Treatment to Prevent Ulceration." (Mo. State Med. Ass'n. v. 16, p. 263, Aug. 1919.)

I most heartily approve of Dr. Jennings' conclusions in which he advocates thoro removal of the foreign body and the application of a protecting bandage for 24 to 48 hours.

FOLLICULAR CONJUNCTIVITIS OR TRACHOMA?

J. R. FERRELL, M.D.

WACO, TEXAS.

Read before the Colorado Congress, July, 1921.

I have chosen this subject because of the controversies that have arisen out of surveys made by the U. S. Public Health Service of the Public Schools, especially in the South. In some of these surveys nearly every case of follicular conjunctivitis, folliculosis or vernal conjunctivitis, has been pronounced trachoma.

It would be a sad condition of affairs if their findings had all been correct. As a matter of fact, in my examinations of our Public Schools for the past six years, I have found less than one-half of one per cent of the school children have trachoma. We are treating this subject from the standpoint of a clinical inspection without going into the laboratory or microscopic findings.

We find many cases of folliculosis where we have no history of the child having suffered any inconvenience from the condition.

In follicular conjunctivitis we find the same small pinkish follicles, or the follicles may stand out in great rolls, with the addition of an inflammation

and some small amount of secretion. This condition is seen mostly in young children.

Vernal catarrhal conjunctivitis more nearly resembles trachoma, but the peculiar bluish appearance of the conjunctiva without the distinctly enlarged capillary vessels, the peculiar white, frothy, sticky secretion, the violent itching of the lids, and the distinct acute attack in spring and the much more tolerable condition in winter, make up the picture for vernal conjunctivitis.

We divide trachoma into three stages; the follicular, the papillary or hyperplastic, and the cicatricial or connective tissue stage.

Among our school children, we have to do almost entirely with the follicular stage of the disease. Occasionally we see one in the papillary stage. It is unusual to find a case of trachoma in young children, but I have seen a few cases as young as six years, where there were adult cases in the family.

The onset sometimes is very insidious, without any distinct inflammatory process. We find the distinctive, grayish white, semitransparent bodies, that have been called sago-grain granulations. They may be disseminated or in rows. They are mostly confined to the palpebral conjunctiva and the upper retro-tarsal fold.

The mucous membrane, that contains the trachoma bodies which fill up the tissues, is pale or yellowish red. Later, as the inflammatory stage progresses with an occasional exacerbation, we find additional discharge that sticks the edges of the lids together. After this stage has been reached, there is no controversy about the diagnosis.

PANOPHTHALMITIS OF ENDOGENOUS ORIGIN.

F. S. COOK, M.D.

EAU CLAIRE, WISCONSIN.

Mrs. S., referred to me August 19, 1920, complaining of severe pain in right eye of two days duration.

Past history: Had been perfectly healthy up to four days ago, when she had a slight headache, increasing in

severity, and localizing in the right eye in the morning of the second day. Began menstruating at this time. The pain in the eye, towards night of the second day, became severe and she put "musterole" on the forehead and eye lids at this time. Pain increased in severity and a doctor was called, who gave her morphin, also used eserin in the eye as he could detect an increased tension. Next day, lids were swollen and eyeball was very hard, pain severe and no vision. I saw her the first time at noon on the third day.

The eye presented the following condition: Lids swollen, conjunctiva injected, movements limited, some exophthalmos, cornea flat, striated and opaque. Infiltration was in the deep layers of the cornea. Tension 60 mm. (Gradle Tonometer). Temperature 102, nose normal, no pus, no evidence of ethmoid disease. X-ray report shows frontal, ethmoid, sphenoid and antra clear. No apical abscess. General examination by an internist reported negative, urine negative, blood count, red cells 4,500,000, whites 9000, H. B. 85%. Smears from the eye show micrococcus catarrhalis. She was put in the hospital, eserin gr. 1 to the oz., 1 drop in the eye every hour. Hot packs, 20 minute every hour and mag. sulp., morphin to control pain. Next day, Aug. 20th, pain was still severe in spite of morphin. There was marked swelling of the lids and exophthalmos was more marked, eye almost stony hard. There were marked lines of pressure on cornea. Eserin was discontinued and hot mag. sulp. stapes put on the eye. At this time the eye seemed to be pushed down and out. White count was 15,000. Deep incisions were made in the orbit under nitrous oxid. No pus could be located. Canthotomy was done. Patient put in a restless day, temperature 102 6/10°. By night cornea was sloughing. The question of enucleation vs. evisceration was discussed pro and con and enucleation decided on for the reason we had not been able to locate any pus in the orbit and felt reasonably sure it was there.

Operation was performed August 21st, five days after first symptom.

Right eye enucleated, tissue very edematous. On incision of Tenon's capsule, a few drops of pus were found at the outer angle. The eye ball was ruptured in two places in freeing adhesions, vitreous escaped. Vitreous fluid, cloudy and looked like pus. Cornea was completely ulcerated. Palpation of orbit, after eye ball was removed, did not disclose any localized pus or thickening of periostium over ethmoid region. Guttapercha drain was put in center, Conjunctiva sutured. Convalescence was uneventful. Temperature dropped to normal on second day after the operation and continued so. On the second day patient complained of pain in the right shoulder, no redness or swelling. This disappeared on the fourth day with no other treatment than heat. Discharged in two weeks.

*Pathologic Report by Dr. King,
Pathologist.*

Gross Specimen: Cornea hazy, ulcerated, ciliary body covered with fibrinous exudate. Retina greatly thickened and thrown in ridges. Section shows cornea denuded of epithelium. Entire thickness shows massive invasion of polymorphonuclear leucocytes. The ciliary body is thickly sprinkled with polys and red blood cells. The ciliary muscle shows invasion. The ciliary processes are embedded in an exudate of fibrin and polys. The retina shows the same exudate and masses of polys are seen in the choroid and sclera. Hyperemia marked thruout. Bacteriologic findings of exudate. Many chains of streptococci. Diagnosis: Suppurative Panophthalmitis.

Comments

Here is a case of panophthalmitis of endogenous origin, coming on in a strong, healthy woman, without any apparent foci of infection. The only disturbance was her menstrual period. Could the embolus come from the distended venous sinus of the uterus? We are told this uterus is the most productive place of emboli. The early stages presented the typical picture of acute fulminating glaucoma. The increased pressure, no doubt, was due to the swelling of the orbital tissue press-

ing on the back of the eyeball and the eyeball being held back by the lids, muscles, etc. There was no pus in orbit and no rupture of the globe previous to operation. What was the cause of the cellulitis? Our classics tell us that we get cellulitis in panophthalmitis of endogenous origin, but it is late and after a rupture of the globe has taken place.

Fuchs's tell us that Tenon's capsule may be implicated in inflammation of the eyeball, so that the inflammatory edema develops in the capsule itself and in the adjoining cellular tissue of the orbit, and that the eyeball is thus pushed forward. Hence a slight degree of exophthalmus is sometimes found in severe cases of irido-cyclitis and in panophthalmitis. Could this be due to the secondary invasion of the Tenon's capsule thru the ciliary veins of the globe?

Ball says that inflammation of the choroid by metastases fortunately is of rare occurrence. It has been found during cerebro-spinal meningitis, typhoid fever, scarlet fever, puerperal fever, erysipelas, mumps, caries of the cranial bones, ulcerating endocarditis, septicemia following surgical operations and compound fractures, and in the course of pneumonia due to influenza. The existence of purulent choroiditis as a metastatic affection was established by Virchow in 1856. Both eyes are usually affected, one after the other. Bull, of New York, who has carefully studied six cases occurring in the course of grippé-pneumonia, and has made two autopsies, states that the microorganisms found in such cases are the staphylococcus albus and aureus, the streptococcus pyogenes, and the pneumococcus. Postpartum metastatic choroiditis usually appears between the sixth and fourteenth days after delivery and is more frequently unilateral than bilateral. It is a sign of the gravest import. Of sixty-three cases collected by Axenfeld, twenty-two were bilateral. Prognosis as to life, in unilateral cases is good; on bilateral, usually fatal. Of nine cases observed by Hirschberg, all died. Recoveries however, have been recorded by Kipp and Wood. Kipp's case was unilateral, and Wood's was bilateral.

Hansell in the Annals of Ophthalmology of 1912, reports a case coming on during the course of acute inflammatory rheumatism. The patient died at the end of the third day. Cultures from the blood showed streptococci, but none could be found in the eyeball.

Graefe and Saemisch make the statement that it is not always possible to find a localized source of pus; and in such

cases, one must assume that the bacteria have entered the body thru a mucous membrane without having excited evident inflammation.

Axenfeld tells us that metastatic ophthalmia is due primarily to the introduction of septic masses into the capillary vessels of the eye. In the binocular form, the first tissue to be infected is the retina; in the monocular, the uvea.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

COLLEGE OF PHYSICIANS OF PHILADELPHIA, SECTION ON OPHTHALMOLOGY.

May 17, 1921.

DR. G. ORAM RING, CHAIRMAN.

Double Coloboma (Nasal and Temporal) of the Optic Nerve.

DR. B. ALEX. RANDALL reported the history of a young woman, whose left eye, hyperopic with practically normal vision, has shown no change in the 12 years she has been under observation. Instead of a vertically oval disc as on the right, she presents a large horizontally oval disc with deep central porus and absorbing crescents of the choroid at both lateral margins. Within these, defined by no "scleroid ring," each disc margin shows a dark "bottomless" depression, sharp-cut outward: the one to the nasal side having the upper nasal vessels passing under its margin, somewhat as the other upper vessels are related to the steep edge of the porus. There is no trace of a colobomatous gap in the choroid or iris. Vision and refraction are equal in the two eyes.

It is a matter of interest that the grandmother presented to the nasal side of her left eye a horizontally oval lesion of the choroid, that might readily have been mistaken for coloboma. He had seen this, however, in its first stage as a patch of choroiditis, in the center of which a bleb of retina was

detached by exudate which ruptured into the vitreous and was absorbed, the vague yellow patch of inflamed choroid then going on to atrophy, with pigment heaping at its margins. The first stage of this condition is beautifully shown in Jaeger's plate, but so far as he knew there is no recorded observation of the later stage, as he had the chance to observe it thru a series of years.

Capsulo-Muscular Advancement Without Incision.

DR. S. LEWIS ZIEGLER exhibited a second case of his simplified operation to supplement the one shown before the Section about a year ago.

A capsulo-muscular advancement of the external rectus of left eye was performed by suture alone, without incision, which brought the eye almost into position. This was accomplished by grasping the muscle thru the conjunctiva, about 12 mm. back from the cornea, and entering a double armed suture by a whip-stitch, first thru one margin of the muscle and then thru the other. The needles were then carried forward over the conjunctiva in a line parallel with each muscle margin and inserted in the sclera at the junction, deeply enough to secure a firm scleral anchorage. The suture was tied in a double surgical loop, and the tissues drawn forcibly forward until the necessary reposition was secured, when the second loop of the knot was tied.

This advancement was supplemented by an exploratory incision over the internal rectus of the same eye thru which the tenotomy hook was passed and the muscle stretched above and below. In doing this a small adhesion of the capsule above was found and incised, which relieved the hypertropia and brought the eye back to normal level. A partial tenotomy of this muscle was also performed which increased the freedom of excursion.

A Liebreich patch was worn for a few days. A slight crumpling of the muscle was evident for one week. There was no inflammatory reaction but redness persisted for one month. The single external suture was easily removed on the twelfth day.

Examination now reveals excellent parallel movement of the eyes in all directions with complete restoration of excursion to the left side. The eyes are perfectly straight, altho a slight tendency to overconverge is sometimes noticed when glasses are omitted.

The result shows that three difficulties have been overcome:

(1) Overconvergence from suppressed image, O. S., relieved by capsulo-muscular advancement of external rectus.

(2) Old contraction of capsule and internal rectus from disuse, relieved by stretching and partial tenotomy.

(3) Hypertropia from adhesion of capsule at upper margin of internal rectus O. S., relieved by division of the adhesion.

DISCUSSION. Dr. H. F. Hansell. The simplicity of Dr. Ziegler's operation makes a strong appeal for its performance in preference to those in which the conjunctiva is incised, the capsule of Tennon opened, and the tendon separated at its attachment, or muscular tissue excised. In this patient and in the one that Dr. Ziegler previously exhibited to the Section, the advancement or shortening was combined with tenotomy of the internus. I suggest that equally good or better traction on the sutures could be obtained with the scleral anchorage made by almost hor-

izontally inserted needles rather than by their vertical insertion.

Dr. Zentmayer said that, in this case, as well as the one previously shown by Dr. Ziegler, the capsulo-muscular advancement had been combined with a tenotomy of the antagonist. Almost any advancement operation, if combined with a tenotomy of the antagonist will give a good primary result. Until a case is shown in which no tenotomy has been done, it will be impossible to judge of the merits of Dr. Ziegler's ingenious procedure.

Dr. Ziegler said, in reply to Dr. Hansell, that he purposely did not converge the sutures before anchoring, as this would distort the tissues at the point of fixation and would not maintain the parallel traction which he considered an essential factor in securing a good result. In answer to Dr. Zentmayer's query as to how much of the effect is due to advancement of the muscle and how much is due to division or weakening of the opposing muscle, it is only necessary to measure the effect of the advancement as soon as the operation is completed, providing binocular vision is good enough to elicit diplopia.

He wished to emphasize the need of searching for capsular adhesions on the side of the contracted muscle which often nullify all efforts to correct the strabismus. This can be done by passing the tenotomy hook thru a small incision in the conjunctiva and exploring the tissues both above and below the muscle. If the hook fails to pass freely, the scissors can be slipped into the conjunctival opening and the adhesion gently divided without disturbing the relations. It is often surprising how this simple manoeuvre may convert an apparent failure into a success. In this case it relieved the hypertropia chiefly.

Electrically Tinted Optical Glass.

DR. SIDNEY L. OLSHO (by invitation) presented specimens of optical lenses treated by exposure to X-rays produced by a special, selfrectifying, air and water cooled tube, in an apparatus recently perfected. Under this process, American crown glass assumes a light

amber tint after an exposure to 100, 50 K. V. for two minutes. Longer exposure deepens the color. The process is therefore under control. German optical glass develops an amethyst cast. For details of this process see Dr. Olsho's paper, p. 644, A. J. O., September, 1921.

DISCUSSION. Dr. Zentmayer. It seems this glass is an artificially produced amethyst glass offered as a substitute for amethyst glass produced by the action of the sun's rays on certain kinds of window glass. My recollection is that in the table put out by the Bureau of Standards, amethyst glass ranks low in its power of absorption of ultraviolet rays, whereas for this glass the claim is that it absorbs a very large percentage of these rays.

Dr. Olsho stated that the chart submitted shows the affinity of these lenses for the absorption of ultraviolet rays. The amber tinted lenses are the more effective.

Multifocal Lenses.

DR. SIDNEY L. OLSHO (by invitation) presented specimens of finished multifocal lenses, which are designed to take the place of invisible bifocal lenses and were first described to the Franklin Institute, in this city, by their inventor, H. O. Gowlland, of Montreal. The lower or reading portion of this lens presents a continuous variable curve. The periphery of the lower portion is indiscernible. From this periphery there is a gradual accretion of power to the reading centre, the limit being the addition ordered. The lenses are toric in form, ground on a constant —6 D. base, with additions up to 3 D. Any combination is secured by surfacing the other side.

The advantages claimed for this lens are: The possibility of embodying in one lens, powers for the intermediate distances between infinity and the reading distance. There is no sharp jump from the distance to the near focus. The wearer is supposedly able to select a focus for any intermediate distance at will, or may bring matter requiring closest scrutiny into the zone controlled by the carefully

positioned centre. The field for close work is more restricted than in the ordinary bifocal, but this restriction is to some extent counterbalanced by the multiple range. These lenses are known under the trade name "Ultifo."

Groenouw's Nodular Keratitis.

DR. WM. ZENTMAYER presented a woman, aged sixty-eight years, who had discovered accidentally four years ago that the vision in the left eye was much impaired. There was nothing in the personal or family history bearing on the ocular condition. The cornea of the eye showed a group of capacities of greenish-gray color, varying in size from one-half to three mm. and of different contours, one or more of them having a sigmoid shape. The lesions were situated immediately beneath the epithelium, which was elevated irregularly, giving to the surface of the cornea an unevenness. There was no ciliary injection and no history of past inflammation. The right eye showed the beginning of a similar condition. He expressed the belief that the process was probably a dystrophy, but doubted whether tuberculosis was an etiologic factor in this particular type of degeneration.

Central Exudative Retinitis.

DR. WM. ZENTMAYER exhibited a man, aged fifty-one years. Dimness of vision of the left eye was first noticed January 1, 1921. In November, 1920, he underwent an ocular examination in the railroad service, and the vision at that time was normal. The loss of vision was accompanied by marked metamorphopsia and halos. One year ago the patient was ill for several weeks, the condition being diagnosed as nervous prostration. Aside from the ordinary diseases of childhood, this was his only illness. No history of injury. Family history negative, von Pirquet and Wassermann negative. V. R. E., 6/5; L. E., 6/30. External conditions normal. Field of vision, right eye slight temporal contraction, left eye temporal contraction with a central positive scotoma.

Ophthalmoscope: The right eye showed in the macular region a group

of grayish-white, irregular shaped lesions averaging about the diameter of the first branch of the vessels, occupying an area two-thirds the diameter of the disc and having somewhat of a rosette arrangement. In the left eye there was an exudation in the macula about four times the disc in size, with an elevation of about 1 mm. There was a corona of hemorrhage surrounding its margin. Because of the normal functioning of the right eye, the lesion was looked upon as a hyalin degeneration. In the left eye the etiologic factor had not as yet been determined.

Foreign Body Occupying the Orbit and Accessory Sinuses.

DR. T. B. HOLLOWAY gave the history of an injury to the right eye in a boy, aged sixteen years, by the explosion of a piece of wrought iron pipe, which had been loaded with powder. At the time of the explosion he was ten feet from the improvised cannon. Examination July 26, 1920, three weeks after the injury, showed a scar, 5 cm. in length, which extended across the middle of the nose. Moderate proptosis of the right eye and marked chemosis of the bulbar conjunctiva. Cornea hazy, anterior chamber deep, iris discolored, and pupil vertically oval and inactive. Complete loss of outward rotation and distinct impairment of the other ocular muscles. A grayish reflex from the vitreous by oblique illumination. Tension minus 2; no 1. p. No mass could be felt about the globe, there was slight tenderness over the lower and inner part of the orbit. Left eye negative, vision 6/6.

An X-ray examination revealed an enormous foreign body, the lower end of which appeared to be free in the nasal cavities with the upper end lodged in the orbit. As extraction from the orbit would be impossible without breaking down the inner wall, Dr. George Fetterolf was called in consultation. He reported "at nasal examination there could be seen and felt a metallic mass at the anterior part of the right nasal cavity between the middle meatus and the septum. Under

ether a pair of strong forceps was applied to the mass and by the use of considerable force and after loosening by lateral movements, withdrawal of the foreign body was effected. It proved to be a horizontal section of an iron pipe measuring 42 mm. in length by 12 mm. in breadth. Removal was followed by a small amount of bleeding."

When the patient was last seen on February 17, 1921, the globe still showed a slightly pinkish-yellow injection and distinct evidence of atrophy. No view of the fundus was possible.

An Illuminated Perimeter with Campimeter Features.

DRS. C. E. FERREE and G. RAND, of Bryn Mawr College (by invitation), exhibited an apparatus devised in response to a request from a committee of the American Ophthalmological Society, for a feasible means of illuminating the perimeter arm with light of good intensity and quality, so that every point on the arm in any meridian in which it might be placed would receive equal intensities of light. Intensity and quality of illumination, however, are only two of the factors which influence the results of the perimeter determination. In devising the apparatus provisions have been made, therefore, for the control of other factors which are of importance. Some of these controls are:

(1) Every point of the perimeter arm in any meridian in which it may be placed receives light of equal intensity and of approximately daylight quality by ammeter and rheostat control. The instrument can be operated on any 110 volt circuit and the results obtained with it are absolutely independent of the variability of daylight illumination.

(2) Provision is made so that the eye, just before receiving the color stimulation, is preexposed to a surface of the brightness of the color as seen at the limits of the color field. The colored stimulus is surrounded also by a field of this same brightness. Variability in these two factors alone may change the limits as much as 20

degrees in some meridians. A further advantage is gained by making the background of the same brightness as the color:—the stimulus disappears completely when the limits of sensitivity to the color is reached, instead of turning into a gray, concerning the colorlessness of which the patient is apt to be in doubt. This gives the effect of the disappearance type of photometer and adds greatly to the ease and certainty of making the judgment.

(3) Accurate provision is made for maintaining the eye at the center of the sphere in the surface of which lies the perimeter arm and of holding a constant and steady fixation. The quick adjustment of the eye is facilitated by three rack and pinion motions. Constancy of relation of the meridians of the retina with the meridians of the field of vision as laid off by the perimeter arm is secured by an especially devised, shape-conforming headrest.

(4) An attachment is provided for controlling the fixation of patients with a central scotoma or pathologic blind area: With the eye properly adjusted for taking the fields, these patients are not able to see a central fixation object.

(5) In order to provide for the mapping of the normal blind spot, and for the quick determination and mapping of central and paracentral scotomata, a tangent screen is added subtending a visual angle of 60 or more degrees. This screen can be quickly and conveniently attached to the stimulus carriage and moved into position.

With the controls provided, a careful worker can reproduce the limits of the color fields within 1 or 2 degrees.

DISCUSSION. Dr. L. C. Peter said it was essential to be able to take fields which can be reproduced. His preference for the tangent screen in perimetric studies has been due to the fact that peripheral field records, altho not nearly so important as central studies, have been entirely unsatisfactory because of imperfect instruments. The sources of error in perimetric work from the clinical standpoint are illumination, variability of

the intensity of the color stimulus, fixation, preexposure, and surrounding field. The perimeter exhibited seems to be as nearly accurate as its practical application in our routine office work demands, without complicating field taking too much by technicalities which will tend to minimize its use. He hoped that some means could be found to have one firm control the manufacture of the instrument, in order that uniformity in the intensity of the color stimuli and the grays necessary for preexposure and surrounding field may be preserved. Without careful attention to this important feature of the perimeter, much of its value will be missed. While Dr. Ferree did not discuss the size of the test object, he believed it should be designated in degrees or fractions of degrees rather than in millimeters.

Dr. Ziegler stated that he had found that electric illumination would yield results differing from daylight and inferior to it. In the first place, the color values are wrong; secondly, the color reactions differ from accepted standards, and thirdly, the fields are too large as compared with daylight findings. These deductions were based on the use of an electric perimeter with transilluminated colors.

The Variable Factors Which Influence the Determination of the Color Fields.

DRS. C. S. FERREE and G. RAND, of Bryn Mawr College, said that the variable factors which influence the apparent limits of color sensitivity are the wave length and purity of the stimulus, the intensity of the stimulus and the visual angle, the length of exposure of the eye, the method of exposure (moving or stationary stimulus), accuracy and steadiness of fixation, the intensity of the general illumination of the retina and its state of adaptation, breadth of pupil, and the brightness of the preexposure and of the background or surrounding field. The most important of these from the standpoint of the work of the office and clinic are the intensity of the stimulus, the brightness of the preexposure and

surrounding field, the intensity of the general illumination and the accuracy and steadiness of fixation.

INTENSITY OF STIMULUS.—By a sufficiently wide variation in this factor alone the fields of color sensitivity may be made to have almost any breadth within the field of vision, to differ radically in shape and even to change or reverse their order of ranking with regard to breadth. For example, with very high intensities the limits of red, yellow and blue are coincident with the limits of white light vision. Green cannot be made to have so wide an extent. With stimuli of medium intensity and of the relative energies found in the prismatic spectrum of a Nernst filament, the limits are concentric and in the order from widest to narrowest of red, yellow, blue and green. With stimuli of medium intensity of equal energy the limits of red, yellow and blue interlace or criss-cross. The limits for green again are narrower. The limits for pigment stimuli may be either interlacing or concentric in the order of red, blue and green or blue, red and green depending upon the intensity of light falling on the perimeter arm. It seems only fair to conclude, therefore, that the conventional clinic rating of the limits from widest to narrowest in the order of blue, red and green is a function of the relative and absolute intensities of the stimuli employed as well as of the actual distribution of sensitivities. Without great precision in the control of intensity, it is obvious that reproducibility of result cannot be obtained and little significance can be attached to extent or shape of field, to order of ranking as to breadth of field, or to any variations from time to time or from person to person in these important features.

BRIGHTNESS OF PREEEXPOSURE AND SURROUNDING FIELD.—The brightness of the surface to which the eye is preexposed may change the apparent limits in certain meridians as much as 17 degrees. A preexposure lighter than the color gives a dark after image; a preexposure darker than the color, a light after image. These after images change

profoundly the saturation of the color, also its hue. The brightness of the surrounding field, thru physiologic induction, exercises a similar effect but not so great in amount. The variable effects both of the preexposure and of the surrounding field are strongly influenced by changes in the intensity of the illumination. When the results are obtained under such ranges of change of illumination as may occur during the course of a given day or from day to day, the variability of effect is greatly increased, reaching in some meridians as much as 28-30 degrees. Further important effects of surrounding field as influenced by change of illumination are the changes in hue which the color undergoes in passing towards the periphery of the retina.

CHARLES R. HEED, M. D. Clerk.

COLORADO OPHTHALMOLOGICAL SOCIETY.

MAY 21, 1921.

DR. J. J. PATTEE presiding.

Tuberculous Iridocyclitis.

F. E. WALLACE, Pueblo, again showed a negro boy, aged sixteen years, who had been presented to the society in October, 1920, on account of a severe chronic irido-cyclitis of both eyes, especially the right, and characterized in the right eye by the presence of a number of one mm. deposits on the posterior surface of the cornea, arranged as a triangle with its apex downward. In the right eye there had also been a number of deposits at the angle of the anterior chamber, some of them two mm. in diameter, as well as deposits on the surface of the iris.

The patient had been very irregular in attendance and in his use of medicine, and had disappeared entirely for nearly six months. The right cornea was now somewhat clearer, and the deposits on Descemet's membrane and on the iris had disappeared; those on Descemet's membrane being replaced by a thin plastic exudate plastered on the membrane at about six o'clock. This exudate was arranged in a triangular

form with the base, six mm. long, near the angle of the anterior chamber, and the apex about four mm. upward. Blood vessels ran from the limbus to the region of the exudate. The vision was counting fingers at two feet. Below the lower half of the limbus was a two mm. strip of muddy red thickening. Superficially the left cornea looked normal, but lateral illumination showed clouded areas in it. The vision of this eye was only about 5/60. Around the optic disc of the left eye was a mottled area which gave one the impression of an irregular heaping up of pigment. This area extended about a disc diameter beyond the disc, except at the temporal side where its width was about two disc diameters.

DISCUSSION.—J. A. Patterson, Colorado Springs, remarked that in October, 1920, he had felt that the corneal condition was tuberculosis, altho there was some question whether syphilis might not also play a part. The fundus was suspicious of syphilis.

W. C. Finnoff, Denver. My impression in examining the right eye was that the condition was syphilitic. This impression is supported by the collar of induration below the right cornea and by the fundus lesion. The character of the infiltration in the right cornea suggests tuberculosis. In the left eye the areas of gray or yellow infiltration, with the absence of vascularity of the cornea, are suggestive of tuberculosis. The boy should have tuberculin if he can be got to take treatment, unless he is losing weight, in which case he may have a pulmonary lesion which might be lit up by tuberculin.

A. C. Magruder, Colorado Springs. This case brings up a tremendous economic problem. Here is a boy sixteen years old, who sooner or later will be a burden to the community. Some legal action should if possible be taken to compel the acceptance of treatment in this case.

Chorioretinitis.

F. E. WALLACE, Pueblo, presented a woman, aged twenty-four years, who had first come in 1913 on account of

poor vision in the right eye. The vision at that time had been R. 7/200, L. 20/15, and was still about the same. The right fundus showed an area of alternating white and black patches upon a grayish background, extending about five disc diameters to the temporal side of the optic disc, and measuring about one and a half disc diameters vertically. There was a floater in the vitreous. The left fundus showed large areas of atrophy above and in the upper temporal field.

DISCUSSION.—W. H. Crisp, Denver, suggested investigation as regards the presence of either tuberculosis or syphilis, or of a focal infection.

Cataract Extraction; Congenital Iris Coloboma.

H. M. THOMPSON, Pueblo, again showed a patient who had been presented at the October, 1920, meeting of the society (See AMERICAN JOURNAL OF OPHTHALMOLOGY, Jan., 1921, page 51) on account of cataract complicated by congenital coloboma of the iris, and left microphthalmus with internal strabismus and nystagmus. Cataract extraction had been undertaken on the left eye as being much the poorer eye of the two. The corneal incision was made downward, the incision enlarged with de Wecker scissors, the iris snipped at each lower attachment, and iridectomy done at the upper central part of the pupil. After capsulotomy the lens refused to present. A strong fibrous band was found connecting the lower borders of the iris. After this band was severed the lens was delivered by such pressure on the cornea above as would pretty certainly have forced out the whole of the vitreous of a normal eye. The lens was as large as one from an eye of normal size. A needling had been done ten days before the presentation of the patient, and vision was now fingers at about ten feet. The right eye would be operated upon in a few days.

DISCUSSION.—W. H. Crisp, Denver, suggested that the fibrous band might have represented undifferentiated mesoblastic tissue from the embryonic period. This tissue would normally

be differentiated to take part in the development of the iris, the suspensory ligament of the lens, and the structures at the angle of the anterior chamber.

W. C. Finnoff, Denver, reviewed the embryology of the anterior segment of the eye, and suggested that the fibrous band was a continuation of the sclerous portion of the mesoderm which normally intruded itself thru the choroidal cleft.

Tuberculous Irido-cyclitis; Cure with Tuberculin.

H. M. THOMPSON, Pueblo, again presented a woman, aged twenty-two years, who had been brought before the society in February last (See AMERICAN JOURNAL OF OPHTHALMOLOGY, June 1921, page 461) on account of a pronounced tuberculous irido-cyclitis of both eyes, with a large tuberculoma in the lower outer portion of the left anterior chamber. Under tuberculin there had been marked improvement. The patient felt well, and had gained ten pounds in weight. The temperature had subsided. The right eye had been slow to improve, but in the left eye the iris had changed from a dirty yellow color to a more normal blue, and the tuberculoma had diminished to one fifth of its former size and from being yellow had become white. The former intense ciliary injection of this eye was absent and the tension had become about normal. At present seven mm. of O. T., number 3, every ten days, did not produce any reaction. During the first few weeks of treatment the tuberculin had caused an intense reaction, the eyes becoming inflamed and very painful, and the arm red and swollen from the site of injection to the shoulder, and at the same time general malaise had been marked.

Acute Iritis Following Arsphenamin.

H. M. THOMPSON, Pueblo, presented a man twenty-five years old who had come to the office complaining of blindness having developed while he was driving his car the day before. There had been a possible initial lesion in France eighteen months previously, but a blood Wassermann several weeks

later had been negative, and the examining physician had assured the patient that his trouble was not luetic. A blood Wassermann on May 15, 1921, was positive to all antigens, and a neurologist reported symptoms of central lues. The vision of the right eye was light perception, of the left 20/30. The optic disc and surrounding tissues were greatly swollen, and the general appearance of the fundus was of an inflammation which had existed for many weeks. On May 16, the patient was given 0.4 gram arsphenamin. Twenty-four hours later he developed an acute iritis. Pain and photophobia were intense, and the pupil dilated only slightly under solid atropin. The fundus was seen with difficulty thru the cloudy media. The left eye was free from iritis but on May 20 the vision was down to 20/50.

DISCUSSION.—W. H. Crisp, Denver, described a case of extremely obstinate syphilitic involvement of both eyes of a man about thirty years of age, in whom, in spite of extremely vigorous antisyphilitic treatment, a strongly positive Wassermann had persisted over a period of many months, and dense vitreous opacities had alternately cleared up and become worse again.

W. C. Finnoff, Denver, also related a case in which after very intensive treatment with mercury, neoarsphenamin, and iodids, the patient had developed a heavy dust like opacity in the vitreous. Some one has said, referring to these cases of failure of supposedly specific antisyphilitic remedies, that salvarsan given intravenously passed thru the system too rapidly, and that the logical way to give it was intramuscularly.

J. A. McCaw, Denver, favored using mercury for syphilis, and especially by inunction, to the point of saturation.

F. E. Wallace, Pueblo, also felt that we tended to overlook the value of pushing mercury, but also insisted that when mercury was pushed it was important to take care of elimination.

Iridoplegia from Injury.

J. J. PATTEE, Pueblo, presented a steelworker, aged thirty-two years, who

had come on February 3, 1921, with the statement that while working in the rail mill he had been struck in the left eye with a piece of hot steel as large as a half dollar. There was a gash six by eight mm. in the sclera and conjunctiva to the inner side of the limbus, and both tissues were burned. The pupil was at that time widely dilated and the iris changed in color. The vision of the injured eye was limited to hand movements. At the time of presentation the pupil remained moderately enlarged, and the vision was 20/80. The fundus was normal.

DISCUSSION.—H. M. Thompson, Pueblo, believed in advising all such patients to have the injured eye refracted, not merely to give it the best possible vision, but also to protect the eyes against further injury.

Choroidal Rupture.

J. J. PATTEE, Pueblo, showed a steel-worker, aged nineteen years, who had come on February 8, 1921, on account of injury from a large "fish plate" which struck him in the left eye. The upper lid was punctured to the inner side of the center, and there was a horizontal gash, a half inch long, about a quarter of an inch above the lower margin of the lid. The lower lid was also punctured near its center. The pupil was considerably dilated. The fundus could not at first be examined satisfactorily, but after a few days two crescent shaped ruptures of the choroid were discovered outward from the disc. These were parallel from end to end and about two disc diameters long. One of them passed almost thru the macula. The present vision was merely of hand movements, altho three weeks after the injury the patient could count fingers at six feet.

DISCUSSION.—W. C. Bane, Denver, suggested that in those cases which showed choroidal rupture from a blow, the pupil usually remained dilated.

J. J. Pattee, Pueblo, had seen several cases in which after a blow upon the eye the pupil had remained permanently dilated.

A. C. Magruder, Colorado Springs, had within the past year seen a pa-

tient who had been struck in the eye with a snowball, with resulting laceration of the iris and marked dilatation of the pupil, but in whom the pupil subsequently returned to its normal size.

Phlyctenular Conjunctivitis.

J. J. PATTEE, Pueblo, presented a man whose right eye had a large area of phlyctenular conjunctivitis considerably resembling an episcleritis. There were, however, four or five very fine granular elevations at the limbus. There was infection about the roots of several teeth.

DISCUSSION.—W. H. Crisp, Denver, remarked that the infected teeth were very likely responsible for the condition.

A. C. Magruder, Colorado Springs, referred to a case recently seen in a woman, aged fifty years, in whose right eye inflammatory lesions occurred first over the internal rectus and later over the other muscular insertions, making a complete circle of the eye. The case had been under treatment for three weeks, and the condition had been tentatively diagnosed as episcleritis or scleritis. All her teeth were out. The nasal sinuses were reported absolutely negative, and so was a general physical examination. For the past week five percent dionin had done more good than anything previously used.

WM. H. CRISP,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

MEETING OF MAY 26, 1921.

DR. E. K. FINDLAY, PRESIDENT.

The Specific Reaction to Lens Substance.

DR. LUDVIG HEKTOEN of Chicago read the paper on this subject, published on page 909.

Mature and Immature Senile Cataract.

LIEUT. COL. HENRY SMITH, of Amritsar, India, gave an address on this subject, published in full page 900.

DISCUSSION.—Dr. W. A. Fisher.—It may be interesting to know that Smith has developed a special technic for re-

moving cataract without the assistance of others, as he has always been far removed from medical centers. There is a six weeks' season twice in the year, Spring and Fall, for removing cataracts and during the season 20 to 35 cataract operations are done daily, all by Col. Smith. The dressings are not removed for nine days after the operation and to see more than 200 patients in one hospital with their eyes bandaged is a sight unusual, and not to be seen at any other place on earth.

He does all this with native assistants and only one trained nurse. He has trained everyone of those about him to do his part and they do it well. He has one nonmedical native to boil his instruments, and one to assist in the operation who can hold the lids away from the eyeball as no other one can.

He has presented the advantages and disadvantages of removing the lens in the capsule, and the advantages and disadvantages of the classical operation of opening the capsule and removing the lens, and leaving the capsule in the eye. It would be a simple matter to convince a surgical society that a tumor should be removed in its capsule if it can be done in that manner. A cataract removed in this manner is considered by ophthalmic surgeons to be the best operation that can be done, but many believe the danger too great to even give it a trial.

Dr. Smith deserves great credit for the many suggestions he has given us, and especially his method of holding the lids away from the eyeball, and this method, or some modification of it, will be the means of saving many eyes that otherwise would be lost, whether the intracapsular or capsulotomy operation is performed. About one-third of his students have modified his method of lid control, and I believe some day will modify the operation he so skillfully performs and make it so simple that all operators will remove lenses in their capsules. Colonel Smith admits that Dr. Barraquer of Barcelona, Spain, has perfected an instrument for that purpose which is a modi-

fication of the one made by Vard Hulen of San Francisco.

The greatest objection to the intracapsular operation that is offered by prominent surgeons the world over is that the pressure necessary to remove a lens in its capsule is dangerous, but if an instrument that will successfully pull the cataract out is produced, it will unquestionably obtain a hearing. If the Barraquer instrument is adopted, I believe universal success can only be obtained when the lids are properly controlled, as by the technic of Col. Smith.

Dr. J. W. Millette, Dayton, Ohio read for Dr. J. W. Wright of Columbus: "I am pleased to know that Colonel Smith has so enthused the profession in this operation that much good will eventually result. Altho my experience in this operation compares with that of Dr. Smith's in a very feeble way, I have confidence that the intracapsular operation will be so firmly accepted by the profession in the near future as to be an established procedure, whether the technic is Dr. Smith's or mine, or some modified form."

Dr. Millette continued: For a number of years, I was very closely associated with Dr. Greene of Dayton, Ohio, who introduced the Smith-Indian method into America. I attended him nearly every Tuesday and Friday, when he went to the Old Soldiers' Home to do his work, where most of his cataract work was done. On one of these trips he remarked to me that he had just read Colonel Smith's paper, in the India Medical Journal, in which he described his method of removing cataracts. After reading the description over very carefully, he performed twenty-seven operations, and these were reported to the American Medical Association—which was the introduction of the Smith intracapsular operation into America.

It fell to my lot, upon the death of Dr. Greene to succeed to his work at the Soldiers' Home, and I have consistently employed the intracapsular operation ever since. A few cases of course are done by the capsulotomy

method but most of my work has been intracapsular. I am very enthusiastic about it, and I am certain that I get better results than I would with the capsulotomy method. Few if any of us get perfect results. Many of the papers we read or hear read are misleading, in that they give too good results, not alone in the intracapsular, but in the capsulotomy method as well.

In those operations which were performed by Col. Smith at Dayton, all were quite successful. At the Soldiers' Home, we had 12; 11 of them are perfect results, three of them were simple operations, and the pupils are central. The vision I have not fully tested yet. We had one infection at the Soldiers' Home, and the man himself admits it was his fault, for within three hours after the operation had been performed, he had his fingers up under the bandage.

At St. Elizabeth's Hospital, we had one infection and one hemorrhage. In neither of these two cases, however, did we expect a good result, and Colonel Smith at the time he operated said that he hoped we might have good results. In one, the left eye of the woman had been removed following glaucoma; she had been septic most of her life, and the remaining eye was almost blind from glaucoma and cataract. She had a panophthalmitis following. In the other case, the woman had a nystagmic, tremulous iris, and a very small lens. She has had four children, whose eyes are all of the same character, and there are four or five generations in which this has been maintained, so that there was not much to expect in that case.

In none of these cases at St. Elizabeth's Hospital did I open the eye until Friday of the following week. Colonel Smith had operated on both eyes of an old colored man; a very good patient. I went in Friday morning the week following to see him, I didn't open the eyes. He was in perfect health; seemingly he had a little gastro-enteritis during the week, but that morning he was feeling well. At 10:45 the nurse saw him, and he was feeling well, and at 11:10 they went in to

get his order for luncheon, and he was dead; it was diagnosed apoplexy. The eyes were perfectly healed, and there was no redness, and with a seemingly perfect result."

Dr. W. Benedict, Rochester, Minn. Three years ago, I went on record in the presence of Dr. Fisher, as being in favor of the intracapsular method of cataract extraction. Not particularly the operation we have heard described to us to-night, but in general intracapsular extractions. Early in my work, I read carefully the articles by Colonel Smith and others who have done intracapsular extraction of cataracts and attempted in my own way to follow them, and as my experience widened, to modify their method. Probably now, my extractions are 50-50 intracapsular and by the capsulotomy method. I will say however, that I lean more toward the intracapsular method of extraction, because our complications are fewer and the final results are better.

In most everything that Colonel Smith has advocated, particularly as to the size of the incision, I agree with him. Without any disrespect at all to Colonel Smith, I will say that I feel it is better to traumatize the cornea less and dress the cases earlier. I have very much less fear in looking at an eye that has been operated on in forty-eight hours, than I have to let it go nine days, and that is based purely on experiences that I have had. I believe there is no danger of loss of vitreous interfering with the ultimate vision in certain classes of cases. When fluid vitreous, as we commonly speak of it is lost, I invariably fill the eyeball until it resumes its normal contour, with salt solution, before the eye is closed.

My experience, small as it has been, has also been different from Colonel Smith's in this respect, that on two, and possibly three occasions I have seen secondary cataracts, after an intracapsular extraction. The same condition was described a year ago by Dr. S. Lewis Ziegler, of Philadelphia, which he called an "adventitious membrane." This membrane was so thick that it required needling for better vi-

sion. In one case, this adventitious membrane was evidently due to a hemorrhage in the chamber; in the other, the cause was not determined.

Furthermore, I have had two cases of iritis following intracapsular extraction; in one of these the iritis may have been influenced by infected teeth, in the other, the cause was not determined. I fully agree with him that the presence of a portion of the capsule, rather than the presence of loose lens matter in the anterior chamber may be a cause of iritis.

Dr. W. H. Wilder, Chicago.—I think that there can be no dissent from the statement that Lt.-Col. Smith as well as other ophthalmic surgeons have made, that the removal of the cataract in its capsule is the ideal method. We should like to get rid of the capsule, for its presence so often gives rise to difficult after cataract. There is no question that excellent results are obtained by the intracapsular method, but it is equally true that excellent results are obtained by the capsulotomy method. The whole question hinges on the relative safety of the two methods.

As an argument in favor of the intracapsular method it is stated that the presence of the capsule after the extraction of the lens is the cause of a great deal of irritation and possibly postoperative inflammation of the eye. With this my own experience does not agree. Of course, if the capsule becomes loosened and entangled in the wound it may delay healing and may even cause serious complication such as glaucoma, but this is very uncommon. Much more frequent is irritation of the eye from the presence in the anterior chamber of unexpelled cortical substance, and I think that it is the cortical substance rather than the remaining capsule that gives rise to the postoperative irritation; and if this cortical substance or most of it can be removed from the eye at the time of the operation, either by gentle manipulation or by irrigation, the case gets well much more promptly, and often without any reaction.

Naturally the difficulty of removing

all of the cortical substance is increased if the cataract is not quite mature, and it would seem to me that in this class of immature cataracts the intracapsular method would have its greatest usefulness if it can be demonstrated to be equally safe. In this connection it is interesting to note that the free cortical substance in the anterior chamber seems to cause much more irritation in the old than in the young eye. How frequently we observe the juvenile cataract being absorbed after discussion with little irritation of the eye, certainly nothing like that which follows when cortical substance in any amount is left after extraction in older subjects.

One point that is emphasized in the excellent paper of Colonel Smith, and I believe by all the advocates of the intracapsular method, is the importance of perfect control of the lids during the operation, and for this purpose a suitable retractor and a skilled assistant would seem to be necessary. Without such control of the lids, the dangers of the method are apparent.

Dr. W. H. Wilder, Chicago.—I cannot let go unchallenged the statement that has been made in the discussion, that loss of vitreous is not such a serious thing. It is one of the most serious accidents that may befall in the course of a cataract operation, and one never can foretell how grave may be its results. Of course, everyone with any degree of experience has had cases that have terminated favorably after vitreous loss of a certain degree. If there is loss of vitreous of any great extent, detachment of the retina or choroid with intraocular hemorrhage may terminate the case then and there. If not so serious as this, delayed healing with cloudy media prevent good vision and stamp the operation a practical failure. We all know the painful sequelae of such cases and if any method can be devised to do the cataract operation with a minimum risk of loss of vitreous, we should certainly welcome it.

So it occurred to me that one of the most striking points in Colonel Smith's paper is this: "Can we in any way block the orbicularis muscle so

that it will be temporarily paralyzed?" He has told us that he has carried on experiments on this subject in attempting to block the seventh nerve. Others have been working along the same line and it seems to me that if anything of that kind could be accomplished, it would be one of the greatest additions to our technic that has ever been offered, because then, such a method as the intracapsular operation could be practiced with much less danger of vitreous loss, even by the less experienced operator.

Until safer technic is perfected, and unless he has had exceptional opportunities for studying and practicing this method, my advice to the younger operator would be to stick to the method which combined experience tells him is the safest one, and I do not want the idea to go out that the loss of vitreous is a trivial matter for altho we may get good results in some cases, we are sure to get some very poor results or failure in many others.

Now that brings out the last point I would like to emphasize, and it is this: there are so many little variations of technic. If a man finds that he has a technic which suits him and with which he is getting good results, unless he readily adapts himself to different methods he had better stick to that, rather than to be constantly changing at every suggestion.

Dr. Oliver Tydings would ask Is there any reason why we should stick to the old in spite of the superiority of the new? A rhinologist who had held the chair of that branch for twenty years in the State University, had never done a sphenoid operation because he had heard a German professor say "No man ever operated on the sphenoid without a death." I will say to any man who will adopt the technic of Col Smith to-day he will soon acquire confidence which will enable him to do a better operation than he will ever do by any other method.

Dr. Outen had seen Col. Smith work in India, and later he had been permitted to operate in his Clinic, and had lost the fear of cataract operations. Don't think the patients who visit Col.

Smith's clinic are ignorant. They are not by any means. Some of the highest intelligence of India has been to that Clinic and the Hindoo is one of the most enlightened men in the world.

Dr. H. W. Woodruff, Joliet, Ill.: The outstanding feature of Col. Smith's paper is its practical nature. My experience with the cataract operation has been small indeed compared with Col. Smith's; but it has been my own and therefore more valuable to me than some one else's experience.

There are objections to allowing operated eyes to remain bandaged and without inspection for as long a period as nine days. The following case will illustrate one of these objections. Ten days after performing a cataract operation, the corneal flap was found protruding between the eyelids. There was no infection but the cornea was naturally very white. This corneal flap could be held in place only by a conjunctival flap; and much to my surprise the cornea regained its transparency after this operation was done; but only after several weeks. Ultimately, useful vision was secured.

Also infection may follow the cataract operation. It is not always painful, and if the eye has not been inspected for nine days the cornea may slough entirely away. Infection is not by any means entirely hopeless if discovered early enough. Many of these cases can be saved by the deep subcapsular injections of solution of cyanid of mercury 1 to 1000. To save infected eyes they should be inspected twenty-four to forty-eight hours after the operation.

By using the Smith hook the inspection of these eyes is easy and safe.

Dr. W. E. Quine being called upon referred to Col. Smith's experience as a general surgeon. He regarded ophthalmology as the most highly developed specialty and congratulated Col. Smith on his great work.

Col. Smith in closing said: The vitreous is much more liable to escape in cases where it is fluid. Then as to determining results of the escape of vitreous, where the vitreous is fluid,

you are not assuming a fair case. An eye that has a cataract in it is not a sound eye to start with, and an eye that has a fluid vitreous is very far from a sound eye; and the results would be much more liable to be bad with the fluid vitreous than with a sound vitreous. Dr. Wilder does not go so far as to say that we despise the escape of vitreous. I don't know that any ophthalmologist despises the escape of vitreous; but we want to see as little of that precious body as we can. It is all a question of how we can see the least of it, and we are just as keen to see as little of it as any man.

I have seen a lot of congenital cataracts, with the cornea from the size of a frog's eye up. Those congenital ones are highly hereditary, and you see three or four in one family, and if you go back a generation, you will find them all with cataracts. These patients are really never sound with a cataractous eye, and when you get one congenital malformation, I think everybody recognizes that you are exceedingly liable to find two or more others in the same patient. You may find them idiotic. Apparently all should go right, and lo and behold, you occasionally get a violent petit mal, so that I would say that your prognos-

As regards the corneal flap being pushed down, I presume, by the upper eyelid, I have not seen those cases, but it might have occurred.

However, I have seen the patient often do his utmost to fix it there on the operating table, and in a case of that sort, I have no hesitation in putting a stitch in the two eyelids. He will have his eye open and get it in this position if he can, but if you will simply put a small stitch in the two eyelids, I think there need not be any further repetition of this experience.

In regard to Dr. Wilder's remarks about the needling of a cataract in childhood. I would say that a cataract in childhood and youth has need for a very careful diagnosis before you touch it. If it is of an opalescent appearance, you can needle it with beautiful results, but if it is a sort of a pale, white cataract you may needle it forty times, and that pale, white, stringy, jelly like appearance will continue, and it will not be absorbed; it should be extracted.

ROBERT VON DER HEYDT,
Corresponding Secretary.

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FUNDUS PHOTOGRAPHY.

If we could photograph the fundus of the eye, what magnificent case records we would have! Especially if it were possible to get the best results that are now attained in color photography. Memory plays strange tricks with us, which we only recognize when memory is checked up with a new examination, or some less changeable record. Few of us are artists capable of reproducing even approximately the forms and colors that we see. Those who can do so can only find time for a very few of the many ophthalmoscopic pictures that pass before them day after day; and those who hire an artist to paint for them can only do it for a few of the most important conditions encountered. This being the situation, we still must hope for advances in photography. A better understanding of its limitations as applied to reproducing the appearances seen at the back of the eye, may help the development of its possibilities.

Photography is easy in proportion to the amount of light coming from the

object to the sensitized film or plate. Very feeble light will suffice if the exposure is long enough. Stars quite invisible to the eye may be photographed by prolonged exposure. But prolonged exposure is impossible for the background of the eye. Even very slight movement during the period of exposure is fatal to the clearness of the picture. The retinal details that it is desired to record are very minute, and correspondingly easily blurred by movement. It is hard enough to keep the head still for portrait photography, except with a wide angle portrait lens, that will take all the light from the face and concentrate it on a relatively small area of the plate and so make the impression with a short exposure. It is even more difficult to keep the eye perfectly still, for any length of time, than it is to hold the head still.

Then in the kind of light given off from the back of the eye to the photographic film, there is another special difficulty to be overcome. The photographic film is most affected by the "chemical rays," the short wave light

and ultraviolet rays; and it is least affected by the red rays of the spectrum. But the action of the dioptric media is such that practically none of the ultraviolet radiations reach the retina; and very little of the light from the violet end of the spectrum is returned from the ocular fundus. The predominant color of the light returned from the background of the eye is red, the light that makes the least impression on the photographic film and requires the longest exposure.

Another special difficulty in fundus photography is caused by the reflexes from the dioptric surfaces, particularly the anterior surface of the cornea. We know how the corneal reflex often complicates ordinary ophthalmoscopy. It can readily drown out the fundus image, and must be gotten rid of to photograph the fundus. Only the most perfect "reflexless" system of illumination can give valuable results. This makes it necessary that the light shall enter the eye thru one part of the pupil, and shall emerge to enter the camera thru a totally different portion. This, with the need for getting all the light possible, makes it necessary to have the pupil widely dilated.

But the dilated pupil always exposes marked aberration at its periphery, and light coming thru this periphery tends to blur the photographic picture. The ideal arrangement would be to have the light enter thru the periphery in such a way as to be evenly diffused over the fundus, and then to admit to the camera only the light passing out thru the central area of the pupil, having the most regular refraction. The methods thus far found practicable have used one-half of the pupil to admit light, the other half to photograph thru. Or, as done by Dimmer, the light is brought in thru one edge of the pupil, and emerges to the camera thru the other parts of the pupillary area.

Finally the essential structure and dioptric properties of the eye itself, limit the application of photography in recording the appearances seen with the ophthalmoscope. In an emmetropic eye, or

one wearing its refractive correction, parallel rays are only perfectly focussed on the central part of the retina. The rays coming from points on the periphery of the visual field will be focussed behind the retina, the eye is hyperopic except for the point looked at, and the area adjoining it. The surface at which rays are focussed on secondary axes is not a plane, but neither is it the retinal surface. It is a curve that passes thru the fovea and behind the peripheral portions of the retina. Points on this curved surface might all be perfectly focussed by the camera, but not the peripheral portions of the fundus that lie in front of this curve. Not all parts of the photographic picture can be perfectly focussed in any case: and this limits the distinctness of detail that can be attained thruout a large part of the picture.

Of course structures having different depths, like the edge and bottom of a glaucoma cup, or the apex of a swollen nerve head and the unswollen retina around it, cannot both be shown distinctly in the same picture; as the artist can portray them with his brush, or as the eye can see them with the ordinary ophthalmoscope, by an almost unconscious adjustment of accommodation or distance. Eyes with irregular astigmatism, hazy media, nystagmus, or such poor vision in the fellow eye as to prevent accurate fixation, would all be unsuited to giving even such results as photography might obtain from other eyes.

Fundus photography has attracted the interest of ophthalmologists ever since they have used the ophthalmoscope. The writer attempted it in the earliest years of his work in ophthalmology, but accomplished nothing worth publishing. In this country Howe has worked at it, and H. D. Noyes reported his efforts in 1862. But it was not until 1891 that Gerloff, and later Thorner and Wolff, got useful pictures by application of their "reflexless" ophthalmoscopes. Dimmer, who has done the most in this direction (see p. 939), uses an electric arc light, with a suitable condensing system and

diaphragm, obtaining a pencil of rays that is reflected into one edge of the pupil. The emergent rays are received in a specially devised camera. The patient's head is carefully fixed, and his eye fixed by direction of its fellow. The picture is taken with all extraneous light carefully excluded from the apparatus.

In this way is obtained a negative that can be enlarged to 4 or 5 times the diameter of the structures shown, about one-third the enlargement of the ordinary ophthalmoscopic image by the direct method. Dimmer's pictures are about 36 mm. in diameter, and they are not sharp enough to bear any further enlargement. Nordenson and Wertheim-Solomonson, using the lens system of the large Gullstrand ophthalmoscope, have gotten slightly greater enlargement (5.5 to 6 diameters); but it is manifest that such pictures cannot exhibit the finer details that we are accustomed to study with the ophthalmoscope.

However, as Dimmer points out, it is worth a good deal to have even an outline of the exact topography of the fundus, upon which the finer details can be sketched in. It is possible that the instrument and its use can be so simplified that fundus photography can be more widely applied for this purpose. Dimmer has been able to take his pictures with an exposure of 1/20 of a second. It is possible that transillumination from the nose or pharynx, might be so perfected as to furnish an illumination free from the drawback of reflexes, and sufficiently strong to allow even shorter exposures. At any rate it is worth while for the wideawake ophthalmologist to have in mind what can be done by fundus photography, and along what lines greater usefulness is to be expected for it.

E. J.

THE YEAR 1921.

Altho the year has been a difficult one for printers and publishers THE AMERICAN JOURNAL OF OPHTHALMOLOGY and OPHTHALMIC LITERATURE have been published regularly without lowering their standards and without any

financial deficit. In the matter of colored plates we have been able to offer fewer than we wished, but in this we have done better than any other ophthalmic journal in the world. To make the improvements already planned and which are needed to make these journals of the highest usefulness to their readers we must still have the loyal support of our subscribers. The list grows a little each month. But there are thousands of ophthalmologists in America alone who need such a journal but do not take it. Other methods will be tried but the best way to bring it to the attention of such colleagues is by the personal mention of those who take and read our journal.

INDEXES.

Completing the fourth volume of this series of the AMERICAN JOURNAL OF OPHTHALMOLOGY this number has included with it the indexes of authors' names and topics for the current year. These are found at the end of this number preceded by the title page, and the list of plates. In binding the volume it is intended that they should be placed at the beginning of the volume, preceding the January number.

CORRECTION.

The boundless possibilities of overlooking omissions and errors until the whole thing is printed is illustrated on page 632 of the August number in the omission of the first name of George E. de Schweinitz. Probably no reader was left in uncertainty by that omission but the name is so familiar that it would seem as tho proof readers if not printers would note the error. Yet it was more than three months before the Editor had his attention called to this glaring defect on an editorial page.

Lest any ambiguity be left in the mind of the reader it should be mentioned that Dr. de Schweinitz graduated in Medicine in the spring of 1881: but he spent two years as interne in the University Hospital and was engaged in general practice, so that it was about six years after graduation that he began to teach ophthalmology.

BOOK NOTICES.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Col. Casey A. Wood, M.R.C., U.S.A., M.D., D.C.L. Assisted by a large staff of collaborators. Fully illustrated. Vol. XVIII, pp. 13545 to 14122. Chicago, Cleveland Press. 1921.

The editor of this great work is to be congratulated upon its completion, the collaborators may view with pleasure their connection with such an honorable achievement; and the publisher can feel satisfied with the way he has kept faith with his subscribers in bringing out in such difficult times the work undertaken along its original lines, altho in such a novel undertaking it was impossible to know at the beginning just what was involved in it. But the greatest benefit has come to all English reading ophthalmologists in that so much of what is known about ophthalmology has been brought together under systematic, alphabetic arrangement. Every one who wishes to know all he can of ophthalmology will find this his most important work of reference.

Altho this volume carries the list of topics to the end of the alphabet, ending as it does with "zygotes," it is greatly to be hoped that there will be one more volume, containing an index, and supplementary articles that will bring the work, begun in 1913, entirely up to date. The Encyclopedia Britannica has been worked on over 150 years, until its arrangement is most carefully elaborated. But a whole volume of nearly 1000 five column pages is given to its index and classified table of articles; and those who use that encyclopedia know that this volume is the most useful single volume of the 29. Next to it in usefulness and interest will doubtless be the supplementary volumes which are announced to bring the work from 1911 up to date. We shall look forward to such a supplementary volume of the American Encyclopedia of Ophthalmology as the one that really completes the work.

The longest article in this volume,

293 pages, is entitled; "War, Medicine and Surgery in." It is really a continuation of the one of 116 pages in Vol. X, on "Military Surgery of the Eye," and is by the same author, Lloyd Mills of Los Angeles. The two taken together, with certain shorter articles that are crossreferenced here, would constitute an extended and fairly complete monograph, containing adequate presentation of all about the lesions of the eye and related parts, that has been published, especially the literature of the last 7 years.

Next to this in length, 43 pages, comes the section on Visual Economics by E. E. Holt of Portland, Maine. This article is arranged in numbered paragraphs convenient for reference. It relates the compensation for loss of sight to that proper for other disabilities from injury; and is based on the view that money compensation can be justly estimated by mathematic formulas. A third collaborator, whose contributions rank with those above mentioned in extent, is T. H. Shastid, who contributes to this volume about 110 biographic sketches. Most of them are quite brief; but taken with those in preceding volumes, they complete a fairly full history of those who have built ophthalmology as we know it today, especially complete with reference to American ophthalmologists.

Our notices of this series of volumes would be incomplete, did we fail again to call attention to the immense amount of labor that has been done on them by their Editor. The work is sometimes spoken of as "Wood's Encyclopedia." Yet we doubt if those who so speak of it often realize to what an extent the name is appropriate. In this volume, of less than 600 topics mentioned, 410 are treated by the Editor. Many of these are mere definitions of a line or so in length; but 30 of them are each longer than one page, the longest being 27 pages. Altogether they occupy about one-fourth of the whole volume. Again congratulations to this indefatigable worker. Appreciation of what he has done for his profession will come to him so long as he

lives. But doubtless, what he most enjoys now is the feeling that here is a good piece of work finished; with time and strength left to turn to other self-imposed tasks, equally interesting, equally creditable and truly serviceable to his fellow-men.

E. J.

Der Augenspiegel und die ophthalmoskopische Diagnostik. von Dr. Friedrich Dimmer. Professor in Wien. Third Edition. Octavo. 646 pages, 16 plates and 146 figures in the text. Leipsic and Vienna. Franz Deuticke. 1921.

This is the third edition of Dimmer's book, the first having been issued in 1886 and the second in 1893. But so much has been added that it fairly merits consideration as a new work. Altho the first 35 years of use of the ophthalmoscope opened a new field in ophthalmology, the second thirty-five years has shown greater scientific and practical progress in this field than in almost any other department of ophthalmic medicine. This is the largest and most complete work upon its subject that has yet appeared, and its material has been well chosen, and is described without unnecessary multiplication of words.

The characteristic feature of a work on ophthalmoscopy is usually its collection of colored plates. In this work such plates are replaced by plates of photographic reproductions of the ophthalmoscopic appearances. There are 10 such plates, including 150 figures; 8 plates, 120 figures, are from photographs of the fundus of the living eye; while 2 plates, 30 figures, are photographic reproductions from colored plates. They illustrate a wide variety of normal, anomalous and pathologic conditions. Of the first 6 plates, 5 are given to photographic reproductions of the normal and pathologic histology of the parts seen with the ophthalmoscope, and one to reproductions of more or less schematic representations designed to explain the things seen.

A comparison of these photographic representations of the living fundus with those of the more familiar color

sketches, rather emphasizes the real truth of the latter; altho the high scientific value of the photographic representation is also brought out in the former. The photograph cannot supplant the colored plate in teaching the student the color value of the ophthalmoscopic picture; but it can give lines, areas and relations that are exact and may serve to correct any habitual errors of the artist. An appendix of 5 pages to Chapter I supplemented by 3 illustrations explains the arrangement and operation of Dimmer's apparatus for photography of the fundus.

The book is divided into two parts. The first begins with an optical introduction taking up the reflection and refraction of light and the optical system of the eye. Then comes a chapter on the ophthalmoscope and its use, with appendices on the microscopy and photography of the ocular fundus. The next chapter takes up the normal eye-ground, with a note on the fundus oculi of lower animals. The final chapter of the first part is devoted to the measurement of refraction with the ophthalmoscope, both by the erect and inverted images and a section of 50 pages on the shadow test. This last section is by Prof. Salzmann and is an exceptionally clear and thoro exposition of the optical principles of skiascopy.

The second part is devoted to the diagnostics of the ocular changes visible with the ophthalmoscope. It first considers those of the refractive media and iris; and here includes ophthalmoscopy of the angle of the anterior chamber, as worked out by Trantas, and especially by Salzmann. Then, proceeding to the fundus conditions, the first chapter is given to the optic nerve entrance. The second chapter takes up those of the retina, choroid and sclera. Two-thirds of the book are given to the discussion of the changes visible with the ophthalmoscope and their significance, illustrating the greatness of the subject and furnishing the student, intent on mastering this subject, a safe and complete guide.

In general the language is clear, and not difficult reading for one who has

some reading knowledge of German. The full table of contents, 6 pages, and the index, 7 pages, makes it valuable as a book of reference. While it gives no complete bibliographies, the rather frequent references open out the general literature of the subject; and among these references, the American literature is fairly represented.

E. J.

Oculo-Refractive Cyclopedia and Dictionary. Thomas G. Atkinson, M.D., B. Sc. The Professional Press, Inc., Chicago. (See also p. 876.)

This is a book of 432 pages, with numerous illustrations, arranged, as the author states, to give complete information to the practising refractionist with a minimum of difficulty or trouble. The paper and printing, as well as many of the illustrations, are excellent, but the proof reading leaves much to be desired. For example, in the first sentence is the statement: "Abducens. A descriptive name given to the sixth pair of cranial nerves, because their function is to enervate the external rectus muscles" etc., when what is really meant is to *innervate* the external *recti* muscles. Another instance is on page 66, where "blenorhea" instead of *blennorrhœa* is found. On page 80 appears "buphthalmia" and immediately below it is "bupthalmos."

The above are a few of the mistakes found in a cursory glance over the book. As to the information to be obtained, it was rather interesting to find on page 319 that the temporal lobe on each side is the center of pure vision. If by pure vision is meant the correlation of visual with other sensations, this should be stated, but as nothing is said about the occipital lobes, the meaning seems to be that the visual centers are in the temporal lobes. On page 321 is the statement that the "elevation in which is the opening of the lacrymal sac is called the lacrymal papilla." This is true in the same way that the mouth is the opening of the stomach, but is hardly accurate anatomy. On page 320 we find: "O. U. An abbreviation for both eyes (*oculus unius*)."¹ The correct meaning is *oculus uterque*. Again,

the above are taken at random, and indicate the presence of other mistakes.

After finding so much to criticise, it is pleasant to find many articles worthy of commendation, such as the definition and explanation of retinoscopy, frame fitting, accommodation etc. But in the opinion of the reviewer, the errors are so great and so many, that the book cannot be recommended until it has been thoroly gone over and these eliminated.

C. L.

CORRESPONDENCE.

Dr. de Schweinitz' Visit to Peking.

To the Editor: At the dedicatory exercises of the Peking Union Medical College held in Peking, China, Sept. 15-22, 1921, the majority of the trustees of the College and a number of eminent scientists representing Europe, Canada, United States, China and Japan were present. Among the trustees present were Mr. John D. Rockefeller, Jr., Dr. George E. Vincent, Dr. Wm. H. Welch of Johns Hopkins and Dr. Francis W. Peabody from Harvard.

Among the visiting scientists who came as guests of the Rockefeller Foundation were such persons as Dr. George E. de Schweinitz and Dr. John G. Clark of Philadelphia, Dr. Florence R. Sabin of Baltimore, Dr. S. S. Goldwater and Dr. Victor Heiser of New York, Dr. A. B. Mac Callum of Toronto, Dr. R. T. Leiper of London, Dr. T. Tuffier of Paris, Dr. S. Hata of Japan and Dr. Wu Lien Teh of China.

It was a great privilege and a special delight to have Dr. de Schweinitz with us as the representative of the specialty of ophthalmology. Such a representation was all the more fitting because Dr. de Schweinitz came also as the President-elect of the American Medical Association, and in that capacity brought official greetings from the Executive Council of that body.

Dr. de Schweinitz gave the salutary address of the dedicatory exercises on Thursday, September fifteenth, which he followed by a scienti-

fic paper entitled "Concerning the Evolution of the Ocular Symptoms of Pituitary Body Disorders." This paper was admirably supplemented by charts and lantern slides.

The program of the department of ophthalmology during the following days of the conference was as follows:

Friday, September sixteenth:

Eye operations by Dr. H. J. Howard and Dr. T. M. Li.

1. Combined extraction of cataract with insertion of sclero-conjunctival suture.
2. Discussion of secondary cataract.

Saturday, September seventeenth:

Presentation of cases of toxic amblyopia and focal infections.

1. Retrobulbar neuritis with amblyopia caused by eating peppers and vinegar, the latter probably containing methyl alcohol.....Dr. T. M. Li.
2. Quinin amblyopiaDr. H. J. Howard.
3. Iritis caused by chronic prostatitis.....Dr. T. M. Li.
4. Vitreous opacities and diminished vision caused by periapical tooth abscesses..Dr. H. J. Howard.

Dr. de Schweinitz, Dr. Sudaroff of Petrograd, Dr. Neville of Mukden, and Dr. Howard participated in the discussion.

Monday, September nineteenth.

Eye operations by Dr. H. J. Howard and Dr. T. M. Li.

1. Tenotomy of right inferior oblique for traumatic paralysis of the left superior rectus and spasm of the right inferior oblique.
2. Tenotomy of the right inferior oblique for paresis of the left superior rectus.

3. Resection of the the left externus and graduated tenotomy of the left internus for left esotropia.

4. Complete tenotomy of the right internus for right esotropia associated with marked amblyopia.

Tuesday, September twentieth.

Presentation or report of some interesting cases that came to the hospital of the Peking Union Medical College in 1920-1921.

1. Two cases of neuroepithelioma.Dr. H. T. Pi.
2. A case showing a hole in both maculae due to simultaneous injury.....Dr. T. M. Li.
3. A case of marked symblepharon produced by the malpractice of a native quack.....Dr. T. T. Dzen.
4. A case of absolute glaucoma of both eyes in which linen threads had been inserted for filtration and experimental purposes.....Dr. H. J. Howard.

Wednesday, September twenty-first.

Eye operations by Dr. T. M. Li.

1. Heisrath's resection of the tarsus for chronic trachoma and ptosis.
2. Modified Snellen's operation for trichiasis.
3. Expression of follicular trachoma.

Thursday, September twenty-second.

Presentation of cases.

1. Primary optic atrophy due to syphilis.....Dr. T. M. Li.
2. Tuberculous uveitis.....Dr. H. J. Howard.

Address by Dr. George E. de Schweinitz on "Some newer aspects of uveal tract disorders and therapeutic measures for their relief."

HARVEY J. HOWARD.
Peking, China.

ABSTRACTS

Lafon, Ch. *Nystagmus*. Ann. d'OCUL. v. 157, 1920, p. 529-569. (See also A. J. O. v. IV p. 149.)

The first point discussed is nystagmus and *spasmus nutans*. There are three forms of the latter, of which only one is associated with nystagmus, viz. rotation of the head around its vertical axis. It usually disappears at about 2 or 3 years, rarely persists until 7 or 8; but the author has seen it at the age of 30. The nystagmus present is almost invariably of the horizontal variety. It has been suggested that spasmus nutans is a compensatory movement of nystagmus, also that the nystagmus is an effort on the part of the child to supply the movement of objects, to which he has become accustomed, when the head is quiet. The author gives the reasons for rejecting both theories. The explanation he proposes is that as soon as the infant becomes conscious enough to perceive the movement of objects, he attempts to compensate it by head movements which quickly become habitual. But when the sensation of movement disappears, the oscillation persists and becomes independent of the nystagmus. But there must be an underlying psychic disturbance of equilibrium, for the spasm to develop.

Monocular Nystagmus. According to the literature, this condition is very rare. The author reports 3 cases. In the first, the left eye deviated outward, but on attempts at convergence, the divergence diminished and the eye turned downward. In every position, it showed a vertical nystagmus of mild rhythm and slight amplitude, unaffected by exclusion of the right eye. In the second case, with end results of ophthalmia neonatorum in the right eye, this showed a slight convergence with horizontal nystagmus. This, in the primary position, was replaced by rotatory movements, of slight amplitude and irregular rhythm. This disappeared in the lateral position while the amplitude was greater and the rhythm retarded. This was more pronounced on looking towards the right. On look-

ing down or fixing an object, the nystagmus became much less. This was true, also, when the left eye was covered. In forced convergence, it even disappeared. In the third case, the right eye turned out decidedly. During fixation, in any position, it showed fine horizontal nystagmus. On fixing a very close object with the left eye, the right hardly moved, but its nystagmus ceased. When the left was covered, the right showed oscillations of great amplitude and irregular rhythm, but when it was covered, the fine movements were not affected. The author explains monocular nystagmus on the ground that the eye being amblyopic and strabismic lacks the proper power of convergence, which the other eye possesses.

Congenital Nystagmus. As far as can be determined, nystagmus ceases during sleep. During narcosis, it ceases before the disappearance of the reflexes, and does not commence until consciousness reappears. In congenital nystagmus, in 21 patients with normal ears, no case showed abnormal reaction or difference between the labyrinths. No cerebellar trouble was found in any patient.

Vestibular Nystagmus. Convergence has a tendency to inhibit vestibular nystagmus, however evoked. In spontaneous vestibular nystagmus, the movements usually appear only in extreme laterality, and the patient avoids them by not looking to the side. Where they are great enough to bother the patient, he avoids them by converging.

Cerebral Nystagmus. In some affections of the central nervous system, there is nystagmus and diplopia, the latter being transient and requiring careful examination to elicit it. This is a manifestation of an excess of convergence made by the patient in order to diminish the nystagmus. The only difference between cerebral and vestibular nystagmus is one of degree and not of kind, the cerebral having a tendency to become stronger and permanent.

Occupation Nystagmus and Convergence. Miners' nystagmus is polymorphic,

but all show certain common features: it increases on looking up and decreases on looking down; fixation in the primary position increases it, in lateral it is checked; it disappears with discontinuance of the occupation. This form is therefore entirely different from the congenital.

Voluntary Nystagmus. 17 cases have been reported, including one by the author. He regards it as a disturbance in the tonic equilibrium between the controlled muscles, due to an excessive attempt at convergence. The same explanation will probably apply to simulated and to hysterical nystagmus.

The author discusses at length the theories of Sauvinau, H. Coppez and Bard and maintains that they do not explain the conditions satisfactorily. He summarizes his own position as follows:

1. All voluntary movements of the eyes are associated ones, governed by the functions of direction and convergence. These functions are of cortical origin, arising not from one center but from several, associated sensorial centers scattered thru the cortex. They are co-ordinated by centers located probably in the mesencephalon, which transmits them to the oculomotor nucleus. There may exist, also, supranuclear, intermediary and subcortical centers. The vestibular apparatus is connected directly and indirectly, by way of the cerebellum, with the oculomotor apparatus.

2. Congenital nystagmus is a static trouble of one of the elementary functions (laterality, verticality or rotation) of cortical origin, due to a developmental taint. The function of convergence possesses an inhibitory action on nystagmus. When this is impaired by an error of refraction or an intrauterine or postnatal ocular lesion, nystagmus is likely to appear, as is also convergent strabismus. In congenital nystagmus, no lesion of the vestibule or cerebellum is found.

3. Lesions of the cerebellum and vestibule cause nystagmus by virtue of their effect on the function of direction. Since they usually arise after convergence is well developed, the nystagmus usually appears only in extreme lateral positions, which are incompatible with strong con-

vergence. The only difference between spontaneous and provoked nystagmus is that the former is bilateral and the latter unilateral.

4. Occupational, voluntary and hysterical nystagmus are muscular tremblings caused by fatigue or strong contractions. Here the function of direction is not injured, but does not act directly. They are pseudonystagmus, as are the nystagmic movements seen in pareses or contractions of the ocular muscles.

5. From a pathogenic standpoint, true nystagmus is an entity. There are two varieties from an etiologic basis—congenital and acquired. Of the latter there are two subdivisions—labyrinthine and cerebral.

C. L.

Lindner, K. An Endemic of 56 Cases of Gonoblenorrhœa. *Klin M. f. Augenh.* v. 65, 1920, p. 637.

On March 25, 1916, 14 soldiers with gonoblenorrhœa were sent to the eye department at Lublin, the next day 11, then 8, 5, 7, 3, 2, 1, 1 and much later 1, altogether 56. 48 were bilateral and came from the 1st and 4th company. In his search for the origin of infection, Lindner found on the 4th day that a student of pharmacy of the first year, acting as substitute for the reserve surgeon, had inspected the reporting eye patients daily, everted the lids of each and instilled 10% protargol, without washing his hands between. Thus the first patient who had infected his eyes from his gonorrhœa was the originator of this terrible endemic.

By very careful treatment, however excellent results were obtained. In only 2 cases ulceration of the cornea, and in one perforation, occurred; altho 10 patients were over 40, 4 over 50. The majority were in the twenties. The endemic was not mild. Some cases were very severe, so that after subsidence of the acute symptoms the previously extended and then relaxed tarsus showed vertical folds. The treatment consisted in irrigations with pinkish solutions of permanganat of potash every 10 to 15 minutes and applications of nitrat of silver, 2%, twice a day.

C. Z.

Hirsh, C. Air Embolism of Central Retinal Artery after Irrigation of Maxillary Sinus. *Klin. M. f. Augenh.* v. 65, 1920, p. 625.

The right maxillary sinus of a boy, aged 16, was irrigated for removing mucopus and after the fluid had run off, air was blown into the antrum with a clysopump and the canula taken out of the accessory ostium. At this moment the patient said that he could not see with his right eye. The ophthalmoscopic examination about one minute later revealed: palpebral fissure larger than left, eyeball freely movable, perhaps a little protruding, pupil unusually wide, did not react at all. Fundus diffusely grey, disc markedly white, veins normally filled, arteries appeared as white glistening bands without blood. Gradually from the periphery streaks of blood appeared in the arteries, between which air containing parts were visible. The blood columns migrated toward the centers, and after 2 or 3 minutes the blood current was restored, the disc lost its pallor, pupillary reaction and vision returned. The picture corresponded with Stargardt's experimental air embolisms in monkeys and dogs. From this case and literature the author concludes that the phenomena after injection of air into the maxillary and other nasal accessory sinuses, so far interpreted as irritations of the pneumogastric and other reflexes, are to be attributed to air embolisms. To avoid them, the inflation of air and irrigation with strong solutions of peroxid of hydrogen are to be discarded. The accessory ostium is the place for irrigations

with aseptic or antiseptic solutions, as here the least possible lesions occur in perforating the window. C. Z.

Kubik, J. Meningismus after Ganglion Anesthesia. *Klin. M. f. Augenh.* v. 66, 1921, p. 290.

The right eye of a girl, aged 10, of weak constitution, was enucleated under local anesthesia with 2 ccm. of a 1% novocain-adrenalin solution, injected into the ciliary ganglion, on account of absolute glaucoma with secondary hydrocephalus. After 12 hours, the child became restless with marked rigidity of the neck, turning back of the head, pain on movement of the head, convulsive cries, abolition of patellar reflexes, i. e. meningismus. On lumbar puncture the fluid rushed out under high pressure and was of sanguinolent color with a greenish hue, but with no pathologic changes. Temperature subfebrile. The condition was very much improved after this, and normal on the 4th day.

Kubik thinks it most probably was that the injection needle entered too far and injured a cerebral vessel, causing a slowly increasing hemorrhage. The other explanation was that the injection of the novocain solution into the cranial cavity caused toxic phenomena. This was the first complication of this kind observed at Elschnig's clinic after innumerable ganglion anesthesias. However, the same occurred in a man, aged 20, but the meningismus lasted only a day, and in a decrepit woman, aged 45, in whom the symptoms disappeared within 10 days after 3 lumbar punctures of hemorrhagic fluid. C. Z.

AMERICAN OPHTHALMOLOGIC SOCIETIES. GENERAL.

Following is a list of the ophthalmologic societies of the United States, as complete as possible. It is known that there are several societies not shown in this list, but it was not possible to obtain any information regarding them. If the secretaries of the societies not shown here will send information to the Editor of Society Proceedings, a supplementary list will be published.

H.S.G.

GENERAL SOCIETIES.

Section on Ophthalmology, American Medical Association.

Chairman—Dr. N. M. Black, Wells Bldg., Milwaukee, Wis.

Secretary—Dr. G. S. Derby, 7 Hereford St., Boston, Mass.

Meeting—May, 1922.

Place—St. Louis.

American Ophthalmological Society.

President—Dr. William M. Sweet, 1205 Spruce St., Philadelphia, Pa.

Secretary—Thomas B. Holloway, 1819 Chestnut St., Philadelphia, Pa.

Meeting—May, 1922.

Place—Washington, D. C.

American Academy of Ophthalmology and Oto-Laryngology.

President—Dr. Walter R. Parker, David Whitney Bldg., Detroit, Mich.

Secretary—Luther C. Peter, 1529 Spruce St., Philadelphia, Pa.

Meeting—September, 1922.

Place—Minneapolis, Minn.

LOCAL SOCIETIES.

Buffalo Ophthalmic Club.

Secretary—Dr. R. A. Edson, 498 Delaware Ave., Buffalo, N. Y.

Meeting—2nd Thursday each month—October to May. 7:30 P. M.

Place—Varies.

Chicago Ophthalmological Society.

President—Dr. E. K. Findlay, 30 N. Michigan Ave., Chicago, Ill.

Secretary—Dr. M. Goldenburg, 104 S. Michigan Ave., Chicago, Ill.

Meeting—3rd Monday of each month, 8 P. M.

Place—Sherman Hotel, Chicago.

Colorado Ophthalmological Society.

Secretary—Dr. W. H. Crisp, Metropolitan Bldg., Denver, Colo.

Meeting—3rd Saturday of each month. 7:30 P. M.

Annual Congress, last week in July.

Place—Denver, Colorado.

Detroit Ophthalmological Club.

Secretary—Dr. N. Bentley, David Whitney Bldg., Detroit, Mich.

Meeting—2nd Wednesday in each month. 8 P. M.

Place—Wayne County Medical Bldg., Detroit, Mich.

Eye and Ear Section Los Angeles County Medical Association.

President—Dr. J. M. Brown, Brockman Bldg., Los Angeles, California.

Secretary—Dr. J. H. McKellar, Title Insurance Bldg., Los Angeles, Calif.

Time—First Monday of each month.

Los Angeles Ophthalmological Society.

Secretary—Dr. J. Ross Reed, Citizens' Bank Bldg., Pasadena, California.

Meeting—Third Wednesday night of each month from October to May.

Place—Varies.

Object—More study than discussion.

Memphis Society of Ophthalmology and Oto-Laryngology.

Secretary—Dr. S. S. Evans, Exchange Bldg., Memphis, Tenn.

Meeting—2nd Tuesday each month. 8 P. M.

Place—Baptist Hospital, Memphis, Tenn.

Milwaukee Oto-Ophthalmic Club.

President—Dr. J. Gordon, Milwaukee, Wis.

Secretary—Dr. J. E. Guy, 307 Grand Ave., Milwaukee, Wis.

Meeting—3rd Tuesday of each month. 8 P. M.

Place—Milwaukee, Wis.

Minnesota Academy of Ophthalmology and Oto-Laryngology.

President—Dr. J. A. Watson, Physicians & Surgeons Bldg., Minneapolis, Minn.

Secretary—Dr. J. H. Morse, Donaldson Bldg., Minneapolis, Minn.

Meeting—2nd Friday of each month. 8 P. M.

Place—St. Paul and Minneapolis, Minnesota, alternately.

New England Ophthalmological Society.

President—Dr. F. H. Verhoeff, 101 Newbury St., Boston, Mass.

Secretary—Dr. W. H. Lowell, 101 Newbury St., Boston, Mass.

Meeting—3rd Tuesday of each month. 8 P. M.

Place—Massachusetts Charitable Eye and Ear Infirmary, Boston, Mass.

New York Ophthalmological Society.

President—Dr. H. S. Miles, Bridgeport, Conn.

Secretary—Dr. B. Samuels, 33 West 52nd St., New York.

Meeting—2nd Monday of each month. 8 P. M.

Place—Varies.

Omaha and Council Bluffs Ophthalmological and Oto-Laryngological Society.

President—Dr. J. B. Potts, Brandeis Theatre Bldg., Omaha, Neb.

Secretary—Dr. C. Rubendahl, Brandeis Theatre Bldg., Omaha, Neb.

Meeting—3rd Wednesday of each month. 8 P. M.

Place—Varies.

Philadelphia College of Physicians, Section on Ophthalmology.

Chairman—Dr. G. O. Ring, 17th and Walnut Sts., Philadelphia, Pa.

Secretary—Dr. C. R. Heed, 1205 Spruce St., Philadelphia, Pa.

Meeting—3rd Tuesday of each month. 8 P. M.

Place—22nd and Ludlow Sts.

Pittsburgh Ophthalmological Society.

President—Dr. E. B. Heckel, Jenkins Bldg., Pittsburgh, Pa.

Secretary—Dr. A. Krebs, Jenkins Arcade Bldg., Pittsburgh, Pa.

Meeting—1st Monday of each month. 8 P. M.

Place—Varies.

Portland Academy of Ophthalmology and Oto-Laryngology.

President—Dr. R. A. Fenton, Journal Bldg., Portland, Ore.

Secretary—Dr. C. G. French, 1st National Bank Bldg., The Dalles, Ore.

Meeting—Monthly.

Place—Varies.

Puget Sound Academy of Ophthalmology and Oto-Laryngology.

President—Dr. Allison Wanamaker, 817 Summit Ave., Seattle, Washington.

Secretary—Dr. Albert F. Mattice, 614 Cobb Bldg., Seattle, Washington.

Meeting—4th Monday of each month except summer months.

St. Louis Ophthalmic Society.

President—Dr. A. E. Ewing, Metropolitan Bldg., St. Louis, Mo.

Secretary—Dr. W. F. Hardy, Metropolitan Bldg., St. Louis, Mo.

Meeting—4th Friday of each month. 8 P. M.

Place—University Club, St. Louis, Mo.

Rhode Island Ophthalmological Society.

President—Dr. A. A. Fisher, 331 Broad St., Providence, R. I.

Secretary—Dr. J. L. Dowling, 57 Jackson St., Providence, R. I.

Meeting—2nd Thursday of October, December, February and April.

Place—Medical Library, Providence, R. I.

Wills Hospital Ophthalmic Society.

President—Dr. B. Chance, 1305 Spruce St., Philadelphia, Pa.

Secretary—Dr. C. O'Brian, Wills Hospital, 1810 Race St., Philadelphia, Pa.

Meeting—1st Tuesday and 1st Wednesday of alternate months. 8 P. M.

Place—Wills Hospital, 1810 Race St., Philadelphia, Pa.

Sectional Societies.**Pacific Coast Oto-Ophthalmological Society.**

President—Dr. F. Stauffer, Deseret Bank Bldg., Salt Lake City, Utah.

Secretary—Dr. E. D. Lecompte, Boston Bldg., Salt Lake City, Utah.

Meetings—Annual. Next meeting in May, 1922.

Place—Salt Lake City, Utah.

Sioux Valley Eye and Ear Academy.

President—Dr. F. I. Putnam, Sioux Falls, So. Dakota.

Secretary—Dr. L. N. Grosvenor, Huron, So. Dakota.

Meeting—January and July.

Place—January meeting in Sioux City, Iowa, July meeting in Omaha, Neb.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn. Volunteers are needed in other localities.

DEATHS

Dr. Pierre L. Leonard, St. Joseph, Missouri, aged fifty-nine, died September twelfth, after a long illness.

Dr. E. Schneider of Copenhagen died recently. His ophthalmic table was made up from frozen sections of the normal eye.

Dr. Chas. DeWitt Conkey, Duluth, Minnesota, aged sixty-five, died September eighth, at Los Angeles, following an operation for gallstones.

Dr. Gustav A. Aschman, Wheeling, West Virginia, aged sixty-one, died October second, from chronic nephritis and uremia following an operation.

Dr. Walter Lytle Pyle of Philadelphia, died suddenly at his home in Merion, October eighth, from heart disease, at the age of forty-nine years.

Lt. Col. F. P. Maynard, I. M. S. (Retired), died at his home, Audlem, Cheshire, England, September 30, at the age of 57 years. He had recently engaged in practice at Crewe, England.

PERSONALS

Dr. G. I. Hogue, Milwaukee, Wisconsin, has been appointed President of the recently created State Bureau for the Care of the Blind.

Dr. Stuart H. Bowman has located at Stamford, Conn., with offices at 386 Atlantic street, where he will limit his practice to eye, ear, nose and throat.

Mr. J. B. Lawford has been offered the honorary LL.D. of McGill University, and is going to Canada this autumn to receive it. He is an alumnus of that University.

Dr. Kaspar Pischel, of San Francisco, California, who was the first ophthalmologist to perform the Elliot operation for glaucoma in America, is spending a brief vacation in Honolulu. He is making a tour of the Orient and expresses himself as wonderfully pleased with the climate, bathing, etc. of Honolulu.

It has been recently announced that Doctor Hilliard Wood, who has been teaching Ophthalmology and Oto-Laryngology in Nashville for thirty years, has resigned from the faculty of Vanderbilt University. His work will be taken by Doctor M. M. Culom and Doctor W. G. Kennon.

Dr. Ernst Fuchs, of Vienna, was a guest of the Ophthalmological Section of the New York Academy of Medicine the evening of October seventeenth, and read a paper on "Presbyopia." He has been giving a course of lectures in New York on the histology and pathology of the eye.

Drs. James P. Matheson, Clarence N. Peeler, and Henry Lee Sloan of Charlotte, North Carolina, recently purchased a site for \$60,000, and will erect thereon a modern hospital to cost \$125,000 to be used exclusively for the treatment of eye, ear, nose and throat cases. It will be four stories high, with one floor devoted to the private offices of the above named physicians.

Brisseau of Tournai, Belgium, published in 1705 the first account of the nature of cataract. Before that cataract was thought to be a pouring out of some substance on the lens from above, hence the name "cataract." On September twenty-fifth a memorial to Brisseau was unveiled. The Committee in charge have reproduced in pamphlet form his original article as a souvenir. For information address Dr. A. de Mets, 29 avenue Van Eyke, Antwerp.

The second edition of "Yacht Cruising," by Claud Worth affords one more illustration of the versatility of some eye surgeons. It is an expert treatise on cruising, from experience gained during the brief holidays of a busy professional career.

Dr. Frank Allport of Chicago has the sincere sympathy of his friends in the loss of his wife, who died on September twenty-third, following an operation. Mrs. Allport will be sadly missed, not only by her large circle of personal friends, but by the numerous charitable organizations with which she has been actively engaged for many years.

Dr. Casey A. Wood has received the honorary degree of LL.D. from McGill University, which assembled in special convocation on October thirteenth, to celebrate the one-hundredth anniversary of its founding. During his very brief stay in Montreal, Dr. Wood delivered a lecture on "Some Birds I Have Known." The address, which was illustrated with lantern slides, was under the joint auspices of the Province of Quebec Society for the Protection of Birds and of the Natural History Society.

Charles F. Prentice, M.E., of 201 Singer Building, New York City, a well known optometrist, founder of the optometric profession, and author of numerous books and articles on ophthalmic lenses and prisms, including many in the American Encyclopedia of Ophthalmology, has retired from practice and settled permanently at Nelson, B.C. Mr. Prentice is the inventor of the prism dioptry, the unit of prism power now widely accepted in the United States. He also originated the optical terms, prism dioptry, contrageneric, dioptral, photostat, typoscope, chiasmal image and contrameniscus.

SOCIETIES

Prof. J. Van der Hoeve, of Leyden, Holland, addressed the Section of Ophthalmology of the College of Physicians of Philadelphia, October 20. His subject was "Development of the Lacrimal Canal in Normal and Abnormal Conditions."

At the same meeting, Prof. Ernest Fuchs, of Vienne, gave an illustrated address on "Senile Changes in the Optic Nerve, and Senile Amblyopia."

The American Academy of Ophthalmology and Oto-Laryngology have recently decided to establish a museum to be located in the Army Medical Museum at Washington, D. C., and conducted by the curator, the expenses to be borne by the Academy.

At the last meeting of the American Academy of Ophthalmology and Oto-Laryngology the following officers were elected: President, Dr. Walter R. Parker, Detroit; Vice-Presidents, Dr. Ross H. Skillern, Philadelphia, Dr. W. L. Benedict, Rochester, Minn., Dr. John J. Shea, Memphis, Tenn.; Treasurer,

Dr. S. H. Large, Cleveland, Ohio, Secretary, Dr. L. C. Peter, Philadelphia.

At the September meeting of the Indiana State Medical Association, Section of Ophthalmology and Oto-Laryngology, Dr. J. A. Stucky of Lexington, Kentucky, was the guest of honor and addressed the Section on the subject, "Some Phases of the Trachoma Problem." Eighty members attended this section. The officers of the section for the coming year are: Chairman, Dr. Charles H. McCaskey, Indianapolis; and secretary Dr. E. M. Shanklin, Hammond. Drs. Albert E. Bulson, Jr., of Fort Wayne, and George F. Keiper, of Lafayette, were elected to the House of Delegates of the American Medical Association, by the House of Delegates of the Indiana State Medical Association.

At the meeting of the Chicago Ophthalmological Society, October 24th Dr. J. Van der Hoeve, of Leyden, Holland read a paper on "Affections of the Eye Induced by Undue Exposure to Light Rays," and Dr. Robert Von der Heydt a paper on "Physiologic Hyaloid Artery Remains."

MISCELLANEOUS.

The Graduate School of the University of Minnesota, Minneapolis, has announced a special one year course in ophthalmology and oto-laryngology, which began September twenty-eighth.

A Chicago physician was recently fined \$300 by Judge Jacobs in the Des Plaines police court for failure to report three cases of sore eyes in infants under his care. Two of the babies are hopelessly blind, while the third, it is said, has a possible chance of recovery.

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